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*Journal of the American
Geographical Society of New ...*

American Geographical Society of New York

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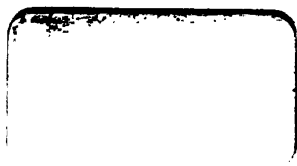


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JOURNAL
OF THE
AMERICAN GEOGRAPHICAL SOCIETY
OF
NEW YORK Soc.

MDCCCLXXXVIII



VOL. XX.

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AMERICAN GEOGRAPHICAL SOCIETY.

OFFICERS AND COUNCILLORS,

1888.

OFFICERS :

PRESIDENT,
CHARLES P. DALY, LL.D.

VICE-PRESIDENTS,
GEN. GEORGE W. CULLUM, U. S. Army. FRANCIS A. STOUT.
GEN. EGBERT L. VIELE.

FOREIGN CORRESPONDING SECRETARY,
PROF. W. LIBBEY, Jr.

DOMESTIC CORRESPONDING SECRETARY,
JAMES MÜHLENBERG BAILEY.

RECORDING SECRETARY,
ELIAL F. HALL.

TREASURER,
WAITER R. T. JONES.

COUNCILLORS :

WILLIAM REMSEN,	CLARENCE KING,
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ISAAC BERNHEIMER,	THEODORE W. DWIGHT, LL.D.,
HARLOW M. HOYT,	D. O. MILLS,
JOHN A. HADDEN,	ORLANDO B. POTTER,
LEVI HOLBROOK.	

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CHARTER OF INCORPORATION.

GRANTED APRIL 13, 1854.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

SECTION 1. George Bancroft, Henry Grinnell, Francis I. Hawks, John C. Zimmerman, Archibald Russell, Joshua Leavitt, William C. H. Waddell, Ridley Watts, S. De Witt Bloodgood, M. Dudley Bean, Hiram Barney, Alexander J. Cotheal, Luther B. Wyman, John Jay, J. Calvin Smith, Henry V. Poor, Cambridge Livingston, Edmund Blunt, Alexander W. Bradford, and their associates, who are now or may become hereafter associated for the purposes of this act, are hereby constituted a body corporate by the name of "The American, Geographical and Statistical Society," for the purpose of collecting and diffusing geographical and statistical information.

§ 2. For the purposes aforesaid, the said Society shall possess the general powers and privileges, and be subject to the general liabilities, contained in the third title of the eighteenth chapter of the first part of the Revised Statutes, so far as the same may be applicable, and may not have been modified or repealed ; but the real and personal estate which the said Society shall be authorized to take, hold, and convey, over and above its library, and maps, charts, instruments, and collections, shall not at any time exceed an amount the clear yearly income of which shall be ten thousand dollars.

§ 3. The officers of said Society shall be a president, three vice-presidents, a corresponding secretary, a recording secretary, a librarian, and a treasurer and such other officers as may from time to time be provided for by the by-laws of the said Society.

§ 4. The said Society, for fixing the terms of admission of its members, for the government of the same, for changing and altering

the officers above named, and for the general regulation and management of its transactions and affairs, shall have power to form a code of by-laws, not inconsistent with the laws of this State, or of the United States, which code, when formed and adopted at a regular meeting, shall, until modified or rescinded, be equally binding as this act upon the said Society, its officers, and its members.

5. The Legislature may, at any time, alter or repeal this act.

6. This act to take effect immediately.

STATE OF NEW YORK, } ss.:
Secretary's Office,

I have compared the preceding with the original law on file in this office, and hereby certify the same to be a correct transcript therefrom, and of the whole of said original law.

Given under my hand and seal of office, at the city of Albany, this
[L. s.] thirteenth day of April, one thousand eight hundred and fifty-four.

A. G. JOHNSON.

Deputy Secretary of State.

AMENDED CHARTER.

PASSED APRIL 8, 1871.

STATE OF NEW YORK, NO. 237, IN SENATE. *March 7, 1871.*—
Introduced with unanimous consent, by Mr. Bradley; read twice,
and referred to the Committee on Literature; reported favorably
from said committee, and committed to the Committee of the
Whole.

CHAP. 373.

AN ACT in relation to The American Geographical and Statistical
Society.

PASSED April 8, 1871.

*The People of the State of New York, represented in Senate and
Assembly, do enact as follows:*

SECTION 1. The name or corporate title of the said Society shall
hereafter be The American Geographical Society of New York.

§ 2. The object of the said Society shall be the advancement of
geographical science; the collection, classification and scientific
arrangement of statistics, and their results; the encouragement of
explorations for the more thorough knowledge of all parts of the
North American continent, and of other parts of the world which
may be imperfectly known; the collection and diffusion of geo-
graphical, statistical and scientific knowledge, by lectures, printed
publications, or other means; the keeping up of a correspondence
with scientific and learned societies in every part of the world, for
the collection and diffusion of information, and the interchange of
books, charts, maps, public reports, documents, and valuable publica-

tions ; the permanent establishment in the city of New York of an institution in which shall be collected, classified, and arranged, geographical and scientific works, voyages, and travels, maps, charts, globes, instruments, documents, manuscripts, prints, engravings, or whatever else may be useful or necessary for supplying full, accurate, and reliable information in respect to every part of the globe, or explanatory of its geography, physical and descriptive ; and its geological history, giving its climatology, its productions, animal, vegetable, and mineral ; its exploration, navigation, and commerce ; having especial reference to that kind of information which should be collected, preserved, and be at all times accessible for public uses in a great maritime and commercial city.

§ 3. The power given by the act hereby accorded to the said Society, to take, hold, convey, manage, and make use of its real and personal estate, shall be understood as authorizing said Society to take and hold by gift, grant, bequest, devise, subject to all provisions of law relative to devises and bequests by last will and testament, or purchase real estate to the value of three hundred thousand dollars, and to invest its income, or its personal estate generally, so as to produce a regular annual income sufficient for the accomplishment of the purposes set forth in the first section of this act ; but said annual income shall not exceed twenty-five thousand dollars annually.

§ 4. The said Society shall make an annual report of its proceedings to the Legislature.

STATE OF NEW YORK, }
Office of Secretary of State, } ss. :

I have compared the preceding with the original law on file in this office, and do hereby certify that the same is a correct transcript therefrom, and of the whole of said original law.

Given under my hand and seal of office, at the city of Albany, this twenty-second day of May, in the year one thousand eight hundred and seventy-one.

DIEDRICH WILLERS, JR.,
Deputy Secretary of State.

BY-LAWS.

CHAPTER I.

TITLE.

The title of the Society is, "The American Geographical Society."

CHAPTER II.

OBJECTS.

The objects of the Society are, "The collecting and diffusing of geographical and statistical information."

CHAPTER III.

MEMBERS.

1. The Society shall consist of Fellows, Honorary, Corresponding, and *ex-officio* members.

2. Honorary members shall be chosen on account of their distinction in the science of geography or statistics, and not more than twelve of them shall hereafter be elected in any one year.

3. Corresponding members shall be chosen from those who have aided the advancement of geography or statistics.

4. *Ex-officio* members shall be foreign diplomatic representatives and consuls resident in the United States ; and United States diplomatic representatives and consuls in foreign countries.

4. Fellows and Corresponding and Honorary members shall be elected as follows : All nominations of candidates shall be openly made in writing at a meeting of the Society, or the Council, by a member thereof, and, together with the name of the member making them, entered on the minutes. The persons thus nominated, when

approved by the Council and elected by the Society, shall, on payment of the initiation fee, if nominated as Fellows, and without such payment if nominated as Corresponding or Honorary members, become members of the Society accordingly.

6. Persons entitled to become *ex-officio* members of the Society shall, on the recommendation of the Council, be, by the Society, constituted and declared to be such members.

7. The name of any member of the Society may, on the recommendation of the Council, and by a vote of two thirds of the members present at a stated meeting of the Society, be dropped from the roll of its members.

CHAPTER IV.

INITIATION FEE AND ANNUAL DUES.

1. The initiation fee, including the dues for the current year, shall be, for a Fellow, ten dollars, to be paid immediately on election.

2. The annual dues thereafter shall be, for a Fellow, ten dollars, to be paid in advance.

3. Any Fellow of the Society, not in arrears, may commute for life all dues for fellowship by the payment at one time, if a Fellow, of one hundred dollars.

4. The name of any Fellow of the Society neglecting for two successive years to pay his annual dues, or at any time wholly refusing to pay them, may by the Council be erased from the list of Fellows of the Society.

5. The fiscal year of the Society shall, for all purposes, be the calendar year—that is, commence on the first day of January, and end with the 31st day of December in each year.

CHAPTER V.

OFFICERS.

1. The officers of the Society shall be a president, three vice-presidents, a foreign corresponding secretary, a domestic corresponding secretary, a recording secretary, a treasurer, and fifteen councillors; and these, together, shall form the Council of the Society.

2. The officers and members of Council elected at the next

annual election (except the president and treasurer) shall, at their first meeting, divide themselves into three classes, each to embrace one vice-president, one secretary, and five members of the Council ; one of which classes shall hold office one year, one for two years, and another for three years, to be determined at said meeting by lot or otherwise. The president and treasurer shall always be elected annually ; and at each annual election thereafter there shall be elected a vice-president, a secretary, and five members of Council, each for the term of three years.

3. All officers of the Society to be chosen at any election may be voted for on one ballot.

CHAPTER VI.

ANNUAL MEETING.

1. The annual meeting of the Society shall be held on the second Tuesday after the first day of January in each and every year hereafter, when the annual election of the officers of the Society shall take place ; and if, from any cause, there shall be a failure of the annual election at the time above designated for that purpose, the same may be held on the Tuesday next following—that is, on the third Tuesday after the first day of January in each year—and of which due notice shall be given.

2. Every member of the Society, who has been such for twenty days or more, and who is not in arrears for his dues for the past year, shall be entitled to vote at the said election.

3. At the annual meeting of the Society the Council shall present a general report of its proceedings and of those of the Society during the past year, and the secretaries and the treasurer shall also present their annual reports,

CHAPTER VII.

MONTHLY AND SPECIAL MEETINGS.

1. The Society, unless otherwise specially ordered by the Society or the Council, shall hold its stated meetings for the transaction of business on the second Tuesday of each month of the year, except July, August, and September.

2. The president, or, in his absence, one of the vice-presidents, may, and upon the written request of five members, shall, call a

special meeting of the Society by giving three days' notice thereof in two daily newspapers published in the city of New York.

CHAPTER VIII.

ORDER OF BUSINESS.

1. At all stated meetings of the Society for the transaction of ordinary business the order of proceedings shall be as follows :

1. Reading of the Minutes.
2. Reports and Communications from Officers of the Society.
3. Reports from the Council.
4. Reports from Committees.
5. Nominations of Members.
6. Special Orders.
7. Unfinished Business.
8. Miscellaneous Business.
9. Papers Read and Addresses Delivered before the Society.

2. All propositions presented for the action of the Society at any of its meetings shall be in writing, when requested by the presiding officer or any member. A proposition thus presented, when seconded and the question thereon stated from the chair, shall be deemed to be in the possession of the Society and open for discussion, but may be withdrawn by the mover at any time before amendment or decision.

3. No member shall speak more than once upon the same question until all the other members present desiring to speak shall have spoken, nor more than twice on any question without leave of the Society.

CHAPTER IX.

QUORUM.

At all meetings of the Society nine members present shall constitute a quorum for the transaction of business.

CHAPTER X.

COMMITTEES.

All committees authorized by the Society shall, unless otherwise specially ordered, consist of three members each, and be appointed by the presiding officer.

CHAPTER XI.

PRESIDING OFFICER.

At all meetings of the Society, on the arrival of the appointed hour and the presence of a quorum, the president, or in his absence one of the vice-presidents, or in the absence of both a chairman *pro tem.*, shall immediately take the chair, call the meeting to order, and preside. He shall have only a casting vote. He shall preserve order and decide all questions of order, subject to an appeal to the Society. He shall also, unless otherwise specially ordered, appoint all committees authorized by the Society ; and at every annual election, before the opening of the polls, he shall appoint two tellers of the election.

CHAPTER XII.

SECRETARIES.

1. Foreign Corresponding Secretary.—It shall be the duty of the foreign corresponding secretary to conduct the general correspondence of the Society with individuals and associate bodies in foreign countries.

2. Domestic Corresponding Secretary.—It shall be the duty of the domestic corresponding secretary to conduct the Society's general correspondence with individuals and associate bodies in the United States.

3. Both the foreign and domestic secretaries shall keep in suitable books to be provided for that purpose, at the Society's rooms, true copies of all letters written by them respectively on behalf of the Society ; and shall preserve, on proper files, at the said rooms, all letters received by them on the same account ; and at each stated meeting of the Society or the Council, they shall respectively report their correspondence, and read the same, or such parts thereof as may be required.

4. In case of vacancy in the office of either of the corresponding secretaries, or in the absence or disability of either of these officers, the duties of both may be performed by the other corresponding secretary.

5. The Society may designate a particular officer, or appoint a committee to prepare a letter or letters on any special occasion.

6. Recording Secretary.—It shall be the duty of the recording

secretary to give due notice of the time and place of all meetings of the Society, and to attend the same. He shall keep fair and accurate minutes of the proceedings of the Society, and record the same, when approved, in the Society's Journal. He shall give immediate notice to the several officers and committees of the Society, of all votes, orders, resolves, and proceedings of the Society affecting them or appertaining to their respective duties. He shall prepare a list of the members of the Society entitled to vote, to be handed to the tellers before the opening of the polls at each annual election. He shall officially sign and affix the corporate seal of the Society to all diplomas and other instruments or documents authorized by the Society or Council. He shall have charge of the corporate seal, charter, by-laws, records, and general archives of the Society, except so far as they may be expressly placed under the charge of others. He shall certify all acts and proceedings of the Society, and shall notify the Council of the death, resignation, or removal of any officer or member of the Society. He shall have charge of the rooms of the Society, and shall perform all such other and further duties as may from time to time be devolved upon him by the Society or the Council. He, together with the Council, shall have the charge and arrangement of the books, maps, and collections belonging to the Society. He shall cause to be kept in the rooms of the Society a registry of all donations to the library or collections of the Society, acknowledge their receipt by letter to the donors, and report the same in writing to the Society at its next stated meeting.

7. All documents relating to the Society and under the charge of the secretaries respectively, shall be placed in such depositories in the rooms of the Society as the Council may provide and designate for that purpose.

CHAPTER XIII.

TREASURER.

The Treasurer shall have charge of and safely keep all contracts, certificates of stock, securities, and muniments of title belonging to the Society. He shall collect the dues and keep the funds of the Society, and disburse the same under the direction of the Council; and so often as the said funds in the hands of the treasurer shall amount to one hundred dollars, he shall deposit the same, in the

name of the Society, in some incorporated bank in the city of New York, to be designated for that purpose by the Council ; and the said funds, thus deposited, shall be drawn out of the said bank on the check of the treasurer, countersigned by the chairman of the Council, and only for the legitimate and authorized purposes of the Society. The treasurer shall, previous to the annual meeting of the Society, prepare and submit to the Council for audit, a detailed account of his receipts and disbursements for account of the Society during the past year ; and which annual account, duly audited, he shall present, with his general report, to the Society at its annual meeting.

CHAPTER XIV.

COUNCIL.

1. The Council shall have the management and control of the affairs, property, and funds of the Society, and shall designate an incorporated bank in the city of New York, where the said funds shall, from time to time as they accrue, be deposited by the treasurer.

2. It may frame its own by-laws, not inconsistent with the charter or by-laws of the Society.

3. It shall appoint the necessary agents, clerks, and servants of the Society, with such powers and duties, privileges and compensation as it may from time to time determine ; and may at pleasure revoke such appointments, and make others in their stead.

4. It shall have power to fill, for the unexpired term, any vacancy that may occur in any of the offices of the Society.

5. It shall have power, at its discretion, to declare vacant the seat of any member of its own body (except the president and vice-presidents) who shall have been absent from its meetings for three successive months ; and also by a vote of a majority of the whole Council to remove from its own body any member thereof for cause ; but in such case it shall be the duty of the Council to report every such vacancy or removal to the Society, at its next stated meeting thereafter, when such cases shall be subject to review by the Society.

6. It shall not, without an approving vote of the Society at a stated meeting thereof, make any contract whereby a liability in amount above one thousand dollars may be incurred by the Society. nor

without such vote make any sale or disposition of the property of the Society exceeding that sum in value.

7. The Council may, in its discretion, remit the initiation fee or annual dues of any member of the Society.

8. No member of the Council shall receive any salary or pecuniary compensation for his services.

9. The Council shall hold stated meetings for the transaction of business at least once in every month, except the months of July, August, and September.

10. At all meetings of the Council, five members present shall constitute a quorum for the transaction of business.

CHAPTER XV.

GENERAL PROVISION AS TO DEBT.

No debt on account of the Society, beyond the funds in the treasury for its payment, shall for any purpose, at any time, be incurred ; and if at any time it shall appear that there are resting upon the Society pecuniary obligations beyond the funds in the treasury for their liquidation, no appropriation of funds from the treasury whatever, except for the necessary current expenses of the Society, shall be made, until the said pecuniary obligation shall be fully discharged, or the funds necessary for their extinction shall have been set apart for that purpose.

CHAPTER XVI.

ALTERATION OF THE BY-LAWS.

No alteration in the by-laws of the Society shall be made unless openly proposed at a stated meeting of the Society, entered on the minutes, with the name of the member proposing the same, and adopted by the Society at a subsequent meeting, by a vote of two thirds of the members present.

CHAPTER XVII.

ADOPTION OF THE BY-LAWS.

The foregoing are hereby adopted and declared to be the by-laws of the Society ; and all by-laws of the Society heretofore adopted are hereby rescinded and declared to be null and void.

HONORARY AND CORRESPONDING MEMBERS AND FELLOWS.

HONORARY MEMBERS.

- | | |
|--|--|
| BAKER, Sir Samuel W., F.R.S.,
F.R.G.S. | MARKHAM, Clements R., K.C.B., Sec-
retary of the Royal Geographical
Society. |
| CONSTANTINE, the Grand Duke, Presi-
dent of the Imperial Russian Geo-
graphical Society, St. Petersburg. | MCCINTOCK, Admiral Sir F.L., R.N. |
| DUFFERIN, the Earl of, Viceroy and
Gov.-General of India. | NARES, Sir George S., R.N., K.C.B. |
| ELDER, Sir Thomas, Adelaide, South
Australia. | NORDENSKIÖLD, Baron A. E., Stock-
holm. |
| ISMAIL, ex-Khedive of Egypt. | PEDRO II., Emperor of Brazil. |
| LAYARD, Sir Austen Henry, D.C.L. | RAWLINSON, Major-General Sir Henry
C., K.C.B., Vice-President of the
Royal Geographical Society. |

CORRESPONDING MEMBERS.

- | | |
|---|---|
| ABBE, Prof. Cleveland, Washington. | NEGRI, Cristoforo, Turin. |
| AMMEN, Rear-Admiral Daniel, U.S.N.,
Washington. | NEY, Count Napoléon, Paris. |
| BARTHOLOMEW, John, Edinburgh. | PACKARD, Prof. A. S., Providence,
R. I. |
| BREWER, Prof. Wm. H. New Haven. | PERALTA, Manuel M. de, Liege. |
| BROWNLEE, HARRISON J., C.E., Mani-
toba. | PRINCE, Hon. L. Bradford, Santa Fé,
N. M. |
| CHAIX, Prof. Paul, Geneva, Switzer-
land. | PUMPELLY, Prof. Raphael. |
| GARDNER, Prof. James T., Albany. | RAE, John, M.D., London. |
| GILLIODTS VAN SEVEREN, L., LL.D.,
Bruges. | RAIMONDI, Antonio, Lima, Peru. |
| GILMAN, Daniel C., LL.D., President
Johns Hopkins University, Baltimore. | ROMERO, Matias, Envoy of Mexico at
Washington. |
| LANDAU, Dr. Wilhelm. | SCHUYLER, Hon. Eugene. |
| LESSEPS, Ferdinand de, Paris. | STANLEY, Henry M. |
| LONG, Col. C. Chaillé, Corea. | VINCENT, Frank, Jr. |
| LUCE, Admiral S. B., U.S.N. | VIVIEN DE SAINT-MARTIN, Versailles. |
| MALTE-BRUN, V. A., Paris. | WALKER, Gen. Francis A., Boston. |
| MACNOIR, Charles, Paris. | WRIGHT, Gen. Horatio G., U.S.A.,
Washington. |
| MAURY, Louis Ferdinand Alfred, Paris. | WYSE, Lt.-Com. Lucien N. B., Paris. |
| MCCARTEE, D. Bethune, M.D., New
York. | YOUNG, Jesse, F.R.G.S., New York. |

FELLOWS.

CORRECTED TO DECEMBER 31, 1888.

Date of Election.	Date of Election.
1859 Arnoux, Hon. William H.	1886 Affleck, J. A.
1869 Auchmuty, Richard Tylden.	1886 Avery, Rush E.
1871 Atterbury, Rev. Wm. W., D.D.	1887 Andrews, Wm. L.
1872 Allen, Horatio M., S. Orange, N. J.	1887 Alexander, Robert C.
1873 Albert, Halpern.	1887 Arnold, Glover C., M.D.
1874 Alexander, Junius B.	1887 Archbold, John D. (L. F.)
1874 Avery, Samuel P. (L. F.)	1887 Allen, Timothy Field.
1874 Agnew, John T. (L. F.)	1888 Alexander, J. F.
1874 Allen, Henry Wilder.	1888 Ashwell, Thomas.
1874 Amy, Henry. (L. F.)	1852 Bancroft, Hon. George, (L. F.), Washington, D. C.
1874 Agnew, Alexander McL.	1852 Barney, Hiram. (L. F.)
1874 Astor, Hon. W. W. (L. F.)	1853 Brown, James M.
1874 Appleton, D. S.	1856 Baker, Francis. (L. F.)
1875 Amsinck, Gustav.	1859 Brown, James. (L. F.)
1876 Appleton, Nathan, Boston, Mass.	1859 Boorman, J. Marcus, (L. F.), Brooklyn, N. Y.
1879 Austin, William.	1859 Bernheimer, Isaac.
1879 Agostini, Joseph.	1859 Belmont, August. (L. F.)
1879 Ashley, L. Seymour.	1859 Barlow, S. L. M.
1879 Astor, John Jacob. (L. F.)	1865 Banvard, John. (L. F.)
1881 Allen, Eben S.	1868 Banks, David.
1881 Armour, Herman O. (L. F.)	1868 Beckwith, N. M.
1883 Ames, Adelbert, Highlands, N. J.	1868 Bennett, James Gordon.
1883 Aub, Albert.	1868 Bernheimer, Adolph.
1883 Atterbury, J. T. (L. F.)	1868 Bernheimer, Simon.
1883 Aikman, Walter M.	1868 Brady, Hon. John R.
1883 Adams, William.	1869 Bailey, Jas. Mühlenberg. (L. F.)
1884 Abbott, Frank, M.D.	1869 Banyer, Goldsboro.
1884 Adler, I., M.D.	1869 Bickmore, Prof. A. S.
1885 Agnew, Andrew G.	1869 Bierstadt, Albert.
1885 Adams, C. H.	1870 Butler, Cyrus.
1885 Auchincloss, E. S.	1870 Bishop, T. Alston. (L. F.)
1886 Appleton, Wm. H.	1872 Brown, Walston H.
1886 Agassiz, Prof. Alex., Cambridge, Mass.	1873 Bailey, N. P.
1886 Allen, Chas. Slover, M.D.	1874 Bishop, D. W. (L. F.)
1886 Allien, Henry V.	1874 Bien, Julius.
1886 Alden, R. Percy.	1874 Bartlett, Willard.
	1874 Bissinger, Philip.

- 1874 Backus, Henry C. (L. F.)
 1874 Baldwin, Townsend B.,
 Tuxedo Park, N. Y.
 1874 Barnes, John S.
 1874 Bonner, Robert.
 1874 Bonn, Wm. B.
 1874 Barnard, Horace.
 1874 Benjamin, John.
 1874 Butler, William Allen.
 1874 Barr, William.
 1874 Belding, Milo M.
 1874 Bookstaver, Hon. Henry W.
 1874 Brownson, Commander W. H.,
 U.S.N. (L. F.), Washington,
 D. C.
 1875 Barney, Charles T.
 1875 Beaman, Charles C.
 1875 Bernheimer, J. A.
 1875 Beckwith, Leonard F.
 1875 Bedle, Hon. Jos. B.,
 Jersey City, N. J.
 1875 Beekman, Gerard.
 1875 Brownell, Silas B.
 1875 Barnes, William.
 1875 Beste, Henry.
 1875 Bredt, Ernest.
 1875 Belknap, Commodore Geo. E.,
 U. S. N., Norfolk, Va.
 1875 Bowie, Augustus, J., Jr.,
 San Francisco, Cal.
 1876 Brower, John.
 1876 Billings, Frederick. (L. F.)
 1877 Bixby, Robert, F. (L. F.)
 1877 Börs, Christian.
 1877 Blanchard, George R.
 1877 Blatchford, Eliphalet W.,
 Chicago, Ill.
 1878 Bliss, Cornelius N. (L. F.)
 1878 Barton, Oliver Grant. (L. F.)
 1878 Brown, Rev. Philip A. H.
 1878 Brand, James.
 1878 Brown, J. Romaine.
 1879 Barattoni, C. A.
 1880 Banks, D. S. (L. F.)
 1881 Baldwin, Edwin.
 1881 Baldwin, Christopher C.
 1881 Babcock, Samuel D.
 1881 Backus, Henry Landon.
 1882 Bamberger, Jacob F.
 1882 Belton, Frank S.
 1882 Baldwin, Octavius D.
 1882 Ballin, Gustav N.
 1882 Bacon, Francis McNeil.
 1882 Babcock, George H.
 1882 Barger, Samuel F. (L. F.)
 1882 Barney, Newcomb C.
 1883 Bowen, Francis C.
 1883 Barclay, J. Searle.
 1883 Brewster, Benj. (L. F.)
 1883 Bachem, C. H.
 1883 Baker, Cyrus O.
 1883 Beekman, Wm. B.
 1883 Berry, Oliver F.
 1883 Bowne, Walter. (L. F.)
 1883 Banta, Theodore M.
 1883 Bangs, Charles W.
 1883 Barr, Edward.
 1883 Bergen, Tunis G.
 1883 Battell, Robbins.
 1883 Bennet, Ludovic.
 1883 Benedict, Robert D.
 1883 Blake, Frederick D.
 1883 Bell, Capt. W. R.
 1883 Benson, Frank Sherman.
 1884 Bentley, Henry, (L. F.)
 Philadelphia, Pa.
 1884 Boynton, Nathaniel A.
 1884 Burrall, F. A., M.D.
 1884 Barton, Geo. De F.
 1884 Bangs, Fletcher H.
 1884 Bonner, G. T.
 1884 Brookfield, William.
 1884 Bassett, E. D.
 1885 Bliss, George T.
 1885 Burnet, Robt. W., Cincinnati, O.
 1886 Barker, P. C., M.D.,
 Morristown, N. J.
 1886 Benjamin, Hon. S. G. W.
 1886 Brown, Hon. Addison. (L. F.)
 1886 Bridgman, E. C.

- 1886 Buckley, Rev. J. M., D.D.
 1886 Bowne, John.
 1886 Bostwick, J. A. (L. F.)
 1886 Blakeman, Birdseye.
 1886 Bowers, John M.
 1886 Bruno, Richard M.
 1886 Bettens, Edward D.
 1886 Backus, J. Bayard.
 1886 Bouvier, M. C.
 1886 Beddall, Edward F.
 1886 Berwind, Edward J.
 1886 Bliss, Alex., Washington, D. C.
 1886 Bond, Frank S.
 1886 Beattie, John.
 1887 Brown, Robt. I. (L. F.)
 1887 Brightman, Horace I.
 1887 Boas, Dr. Franz.
 1887 Blagden, George.
 1887 Biglow, Lucius H. (L. F.)
 1887 Brown, Wm. C.
 1887 Bodine, Mordaunt.
 1887 Berrian, Charles M.
 1887 Bradley, Leonard A. (L. F.)
 1887 Booth, Fredk. A.
 1887 Bentley, John.
 1887 Braker, Conrad, Jr.
 1887 Bend, George H.
 1887 Belden, Josiah.
 1887 Barbey, Henry I. (L. F.)
 1887 Barron, John C., M.D. (L. F.)
 1888 Boyesen, Prof. H. H.
 1888 Bristow, Hon. Benj. H.
 1888 Booker, Wm. Lane.
 1888 Bogert, S. G.
 1888 Berghaus, Dr. Alex.
 1888 Buckham, George.
 1888 Bruce, Sanders D.
 1888 Bancroft, H. H.,
 San Francisco, Cal.
 1888 Burgess, John W.
 1888 Brown, Wm. Smith.
 1888 Ballou, Maturin.
 1888 Breckinridge, Hon. Wm. C. P.,
 Lexington, Ky.
 1888 Baird, John.
 1888 Bacon, Lathrop R.
 1888 Bruen, Alexander J.
 1888 Bogert, Henry L.
 1888 Beers, M. H.
 1888 Barstow, J. Whitney, M.D.,
 Flushing, N. Y.
 1852 Colton, Joseph H. (L. F.)
 1855 Conkling, Col. Frederick A.
 (L. F.)
 1856 Cooper, Hon. Edward.
 1868 Catlin, N. W. Stuyvesant. (L. F.)
 1868 Chapman, Joseph H.
 1869 Cullum, Gen. George W.,
 U. S. Army. (L. F.)
 1870 Conklin, William A.
 1872 Conklin, Eugene E. (L. F.)
 1872 Crawford, Gen. S. W., U.S.A.
 1872 Clark, E. V.
 1874 Connery, Hon. T. B.
 1874 Campbell, Allan.
 1874 Church, Col. George E.,
 London, Eng.
 1874 Christern, F. W.
 1874 Cockcroft, Jacob H. V.
 1874 Chickering, Charles F.
 1874 Comstock, Cornelius.
 1874 Constable, James M.
 1874 Caswell, Wm. H.
 1874 Crerar, John, Chicago, Ill.
 1874 Crocker, David.
 1874 Crosby, Hon. J. Schuyler,
 Washington, D. C.
 1874 Colgate, James B.
 1874 Constantine, Andrew J.
 1874 Conyngham, Wm. L. (L. F.)
 1874 Crosby, Hiram B.
 1874 Crocker, Geo. A.
 1874 Chickering, George H.,
 Boston, Mass.
 1874 Carter, Oliver S., Orange, N. J.
 1875 Clendenin, J. W.
 1875 Cameron, Sir Roderick W. (L. F.)
 1875 Cushman, W. F., M.D.
 1875 Cooper, George C.

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| 1875 Chittenden, S. B., Jr. | 1886 Camp, Hugh N. |
| 1876 Curtis, Benj. L. | 1886 Champney, J. Wells. |
| 1879 Coddington, Gilbert S. (L. F.) | 1886 Chauncey, Elihu. (L. F.) |
| 1879 Caldwell, R. A., M.D. | 1887 Clark, Jefferson. |
| 1879 Childs, George W.,
Philadelphia, Pa. | 1887 Cheney, Alfred C. |
| 1880 Calvin, Delano C. | 1887 Comstock, Anthony. |
| 1880 Cohen, Maurice S. | 1887 Cannon, H. W. |
| 1880 Cormack, John A. | 1887 Conover, A. E. |
| 1880 Coverly, William. | 1887 Cranitch, Wm. I. A. |
| 1881 Clinton, Henry L. (L. F.) | 1887 Curtis, Geo. Wm. |
| 1882 Calhoun, William. | 1887 Compton, A. T. |
| 1882 Clarkson, Banyer. | 1887 Cleveland, Clement, M.D. |
| 1882 Coudert, F. R., I.L.D. | 1888 Colgate, Abner W. |
| 1882 Conkling, Rev. N. W. | 1888 Crimmins, John D. |
| 1883 Clarke, Thos. C. | 1888 Cotheal, Alex. I. (L. F.) |
| 1883 Chapman, Henry E. (L. F.) | 1888 Crall, Leander H. |
| 1883 Colbron, W. T. | 1888 Chase, George. |
| 1883 Chase, H. D. | 1888 Coutan, Adolphe R. (L. F.) |
| 1883 Clyde, W. P. | 1888 Coutan, Chas. Albert. (L. F.) |
| 1883 Clews, Henry. | 1888 Clark, Alfred Corning. (L. F.) |
| 1883 Coit, George M. | 1888 Cook, Henry H. |
| 1883 Candler, Flamen B. | 1888 Canda, Chas. J. |
| 1884 Claflin, John. (L. F.) | 1888 Coleman, James S. |
| 1884 Cook, John C. | 1888 Cross, Richard J. |
| 1884 Carey, Henry T. | 1888 Coston, Wm. F. |
| 1884 Connor, W. E. | 1888 Chapin, Fred'k H.,
Hartford, Conn. |
| 1884 Cummings, Geo. F. | 1888 Chrystie, Wm. F. |
| 1886 Cary, Alanson. | 1888 Chisolm, George E. |
| 1886 Collyer, Rev. Robt., D.D. | 1888 Cochran Wm. F. (L. F.) |
| 1886 Conger, Clarence R. | 1888 Clement, Percival W. |
| 1886 Crosby, Rev. Howard, D.D. | |
| 1886 Cooke, Henry C. | 1855 Daly, Charles P., I.L.D. (L. F.) |
| 1886 Casey, Col. T. L., U.S.A. | 1856 Douglass, Andrew E. |
| 1886 Coffin, Edmund, Jr. | 1856 Dodge, Wm. E. |
| 1886 Church, Benjamin S. | 1856 Detmold, Wm., M.D. |
| 1886 Corthell, E. L. | 1859 Dickerson, E. N. |
| 1886 Cornell, Chas. B., Chicago, Ill. | 1866 Darling, Hon. Wm. A. |
| 1886 Clarke, Stephen G. | 1868 Dwight, Prof. Theo. W. |
| 1886 Carter, Henry C. | 1868 Du Chaillu, Paul B. |
| 1886 Chace, Hon. Jonathan,
Washington, D. C. | 1870 Davis, Alexander J. (L. F.) |
| 1886 Colvin, Verplanck, Albany, N. Y. | 1871 Daly, Hon. Joseph F. |
| 1886 Clarke, C. C. | 1873 Delano, Franklin H. (L. F.) |
| 1886 Calder, George. | 1874 dePeyster, Gen. J. Watts. (L. F.) |
| | 1874 Dutilh, Eugene. |

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| 1874 Delafeld, M. L. | 1886 de Lancey, Edward F. |
| 1874 Dana, Charles A. | 1886 Dayton, Chas. W. |
| 1874 Decker, John J. | 1886 Dean, David J. |
| 1874 Del Monte, Leonardo. | 1886 Drake, Chas. W. |
| 1874 Du Bois, Wm. A. | 1887 de Lima, Edward, Boston, Mass. |
| 1874 Davis, John G. | 1887 Dickinson, John. |
| 1874 Dalrymple, Alexander. | 1887 Dart, Russel. |
| 1874 Dunscombe, Richard T. (L. F.) | 1887 Day, Edward H. |
| 1874 Dun, R. G. | 1887 de Forest, George B. |
| 1875 Darrow, William. | 1887 Davenport, W. F., M.D. |
| 1875 Davies, Julien T. | 1887 Dodman, Alfred C. |
| 1875 Du Bois, Eugene. | 1887 de Castro, Héctor. |
| 1875 Davison, Charles A. | 1887 Donald, James M. |
| 1875 de Peyster, Frederic J. (L. F.) | 1887 Doudge, James R. (L. F.) |
| 1875 Dommerich, L. F. | 1888 Davidson, Prof. Thos. |
| 1877 Day, Henry M. | 1888 Donnelly, Edward C. |
| 1877 Davis, Joseph Beale. (L. F.) | 1888 Dunham, James H. |
| 1878 Dana, Charles. | 1888 Drexel, A. J., Philadelphia, Pa. |
| 1878 di Cesnola, Gen. L. P. | 1888 Drexel, Mrs. Joseph W. |
| 1879 Dahlgrén, Charles B.,
Trenton, N. J. | 1888 Davenport, Hon. Ira, (L. F.),
Bath, N. Y. |
| 1879 Dodge, George E. | 1888 Dana, Richard S. |
| 1880 Deane, John H. (L. F.) | 1888 Dyer, E. Tiffany. |
| 1880 Dyckman, Isaac M. | 1888 Dimpfel, Fred'k P. |
| 1880 Du Bois, James G. | |
| 1880 Du Bois, Frederick N. | 1889 Evarts, Hon. William M. |
| 1880 Dexter, Henry. (L. F.) | 1868 Emmet, Thomas Addis, M.D. |
| 1880 Deen, William M. | 1874 Eaton, Prof. D. Cady,
New Haven, Ct. |
| 1881 Davies, H. B. | |
| 1881 Docharty, Augustus T. (L. F.) | 1875 Ellis John W. |
| 1881 Dowd, William. | 1875 Eimer, Charles. |
| 1882 Dunham, George H. | 1875 Ely, Richard S. |
| 1882 Dunlap, Robert. (L. F.) | 1877 Elderkin, John. |
| 1883 Donnell, E. J. (L. F.) | 1878 Ellis, John, M.D. |
| 1883 Decker, Jos. H. | 1878 Edson, Hon. Franklin. |
| 1884 Davis, Howland. | 1879 Earle, Ferdinand P. |
| 1884 Day, Henry. | 1879 Elliott, Samuel. (L. F.) |
| 1884 Donnelly, Thomas F. | 1880 Eckert, Gen. Thomas T. |
| 1884 Dodge, Richard J. | 1882 Easton, Nelson S. |
| 1884 Dalley, Henry, Jr. | 1882 Ellis, Wilbur Dixon. |
| 1884 Douglas, Jas., Jr. | 1882 Eddy, Ulysses D. |
| 1884 Drake, Jas. M. | 1882 Edinger, August H. |
| 1885 Dupré, Ovide. (L. F.) | 1882 Edwards, Hon. J. Pierrepont,
Bartow on the Sound, N. Y. |
| 1885 De Witt, George G., Jr. | |
| 1886 Dix, Rev. Morgan, D.D. | 1882 Emerson, J. W. |

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| 1882 Emmons, John | 1882 Fairbanks, Leland. |
| 1882 Earle, Joseph P. (L. F.) | 1882 Fellows, Charles H. |
| 1883 Eno, Amos F. | 1883 Fisher, Eustace W., M.D. (L. F.) |
| 1883 Eyre, Maynard C. | 1884 Frazer, Alfred. |
| 1883 Earl, Wm. M. | 1884 Ferrer, Fermin. |
| 1883 Emanuel, J. M. | 1885 Frank, Elias L. |
| 1885 Elmore, Hon. J. Federico,
Washington, D. C. | 1886 Fritsch, Hon. Hugo. |
| 1886 Elliott, S. Lowell,
S. Brooklyn, N. Y. | 1886 Fitch, Chas. E., Rochester, N. Y. |
| 1886 Easton, Robt. T. B. | 1886 Flagler, H. M. (L. F.) |
| 1886 Ellis, Geo. W. | 1886 Fiske, A. K. |
| 1886 Edwards, Walter. | 1886 Fuller, W. H. |
| 1887 Ely, James R. | 1886 Fettretch, Joseph. |
| 1887 Eckert, Wm. H. | 1887 Foyé, Andrew J. C. |
| 1887 Elkins, S. B. | 1887 Friedrichs, E. H. |
| 1887 Eastman, Timothy C. | 1887 Fitzgerald, Louis. |
| 1887 Egleston, Melville. | 1887 Fairfax, Hamilton R. |
| 1888 Edgecomb, Daniel W. | 1887 Floyd, John Gelston. |
| 1888 Erben, Capt. Henry, U.S.N. | 1887 Fellows, Gordon. |
| 1888 Edmunds, Hon. George F.,
Burlington, Vt. | 1888 Fish, Nicholas. |
| | 1888 Ferguson, Walton,
Stamford, Conn. |
| 1854 Field, Cyrus W. (L. F.) | 1888 Ford, Hon. Melbourne H.,
Grand Rapids, Mich. |
| 1856 Field, Hon. David Dudley. | |
| 1856 Field, B. H. (L. F.) | 1856 Greenwood, Isaac J. |
| 1857 Fish, Hon. Hamilton. | 1857 Greene, John W., M.D. (L. F.) |
| 1860 Field, Rev. H. M. | 1859 Griswold, George. (L. F.) |
| 1864 Faile, Thomas H. | 1868 Gebhard, Wm. H. (L. F.) |
| 1871 Fliess, Wm. M. | 1868 Gerry, Elbridge T. (L. F.) |
| 1873 Freedman, Hon. John J. | 1868 Green, Andrew H. |
| 1874 Farragut, Loyall. | 1869 Gilbert, Clinton. |
| 1874 Fellows, John P. | 1872 Gerard, James W. |
| 1874 Fleet, Oliver S. | 1872 Grinnell, R. M., (L. F.),
Skaneateles, N. Y. |
| 1874 Fox, Austen G. (L. F.) | 1873 Glaubensklec, Theo. G. |
| 1875 Foulke, Rev. Thomas. | 1874 Gunther, F. F. |
| 1875 Fargo, James C. | 1874 Gibbs, Theodore K. |
| 1875 Fuller, Charles D. | 1874 Gottsberger, William S. |
| 1875 Ford, James B. | 1874 Galpen, Horace. |
| 1875 Folsom, George W. | 1877 Guleke, H. F., M.D. |
| 1876 Fisk, Gen. Clinton B. (L. F.) | 1879 Graves, Arthur B. (L. F.) |
| 1879 Fellows, John R. | 1879 Gay, Joseph E. |
| 1879 Ferris, Robert M. | 1880 Gunning, William J.,
Norwalk, Ct. |
| 1880 French, Hon. Stephen B. | |
| 1881 Fearing, William H. | 1881 Gallaway, R. M. |

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| 1881 Green, George. (L. F.) | 1870 Harrison, Prof. Thomas F. |
| 1881 Giles, John C. | 1871 Hamilton, Alexander. |
| 1881 Grace, Hon. William R. (L. F.) | 1871 Hand, Clifford A. |
| 1881 Garland, James A. | 1872 Hamersley, John W. (L. F.) |
| 1882 Gilbert, William E. | 1872 Holbrook, Levi. |
| 1882 Gallup, Albert. | 1873 Havemeyer, Hon. Theo. A. |
| 1882 Gardiner, J. Grahame. | 1874 Havemeyer, Hector C. |
| 1883 Greenough, John. (L. F.) | 1874 Hogue, Henry L. |
| 1883 Gottschalk, Felix. | 1874 Hurlbert, Henry A. (L. F.) |
| 1883 Goodridge, John C., Jr. (L. F.) | 1874 Haydock, George G. |
| 1885 Glazier, Simon W. | 1874 Haines, John P. |
| 1885 Gibson, George R. | 1874 Hinton, John H., M.D. (L. F.) |
| 1886 Gilder, R. W. | 1874 Holbrook, Edmund F. |
| 1886 Gallatin, Frederic. | 1874 Hendricks, Edmund. |
| 1886 Gray, George. | 1874 Hendricks, Joshua. |
| 1886 Grummon, J. Ward. | 1874 Hatch, Rufus. |
| 1886 Georger, Louis F. | 1874 Huntington, C. P. |
| 1886 Gunther, W. H. | 1874 Hunter, Capt. Edward, U.S.A.,
Fort Assiniboine, Mont. |
| 1886 Gunther, Franklin L. | 1874 Hoyt, Harlow M. |
| 1886 Gunther, Ernest Rudolph. | 1875 Houston, Col. D. C., U.S.A. |
| 1886 Griffin, Chas. H. | 1875 Howland, Meredith. |
| 1886 Godwin, Parke. | 1875 Hyde, Henry B. |
| 1886 Goodwin, James J. (L. F.) | 1875 Harper, P. J. A. |
| 1886 Grant, James. | 1875 Harris, Sigmund. |
| 1886 Godkin, E. L. | 1875 Hun, Leonard G., Albany, N. Y. |
| 1887 Goodridge, Frederic. | 1876 Holt, Henry. |
| 1887 Grosvenor, Jas. B. M. | 1876 Holman, Frank E. |
| 1887 Gould, George J. | 1876 Hoes, Wm. M. |
| 1887 Gossler, Gustav H. | 1876 Hatfield, J. B. T. |
| 1887 Griswold, John N. A. | 1878 Howe, George S. |
| 1888 Goodwin, C. Ridgely,
Baltimore, Md. | 1878 Herrman, Henry. (L. F.) |
| 1888 Goodwin Chas. S. | 1878 Hinman, Wm. K. |
| 1888 Greene, Byron W. | 1878 Hitchcock, Hiram. |
| 1888 Gard, Anson A. | 1879 Hamilton, William G. |
| 1888 Grafton, Joseph. | 1879 Harris, Col. Robert. |
| | 1880 Hall, Hayden H., Chicago, Ill. |
| 1856 Hewitt, Hon. Abram S. | 1880 Hickox, Charles R. |
| 1856 Hunt, Wilson G. | 1881 Hinman, Russell, Cincinnati, O. |
| 1859 Havemeyer, John C. (L. F.) | 1881 Hoffman, Charles B. |
| 1864 Hammond, Henry B. (L. F.) | 1881 Hamilton, Robert Ray. (L. F.) |
| 1868 Huntington, Daniel. (L. F.) | 1882 Hascall, Theodore F. |
| 1868 Hall, Elial F. | 1882 Higginson, James J. |
| 1868 Hadden, John A. (L. F.) | 1883 Hotchkiss, Horace L. |
| 1868 Hallock, Mrs. Frances. | 1883 Henry, Charles I. |

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| 1883 Hebert, Henry B. | 1888 Hammond, Charles E. |
| 1883 Howell, George R. | 1888 Hayward, James W. |
| 1883 Hyde, E. Francis. | 1888 Higley, Hon. Warren. |
| 1883 Hurry, Edmund Abdy. (L. F.) | 1888 Harbeck, Chas. T. |
| 1883 Hoyt, Alfred M. (L. F.) | |
| 1883 Hendricks, Arthur T. | 1859 Ireland, John B. |
| 1885 Hubbard, Walter, Meriden, Ct. | 1874 Iselin, Adrian, Jr. |
| 1885 Homer, Chas. S., Jr. | 1881 Ives, Brayton. (L. F.) |
| 1885 Henry, Edward L. | 1883 Ives, James M. |
| 1886 Hoe, Robert. | 1886 Irving, John Treat. |
| 1886 Huidekoper, Arthur C.,
Meadville, Pa. | 1887 Isham, Charles. (L. F.) |
| 1886 Henderson, Harold G. | 1887 Inslee, Samuel. |
| 1886 Haldane, W. H. | 1887 Ivison, David B. (L. F.) |
| 1886 Hoyt, Colgate. | 1888 Irving, Cortlandt. |
| 1886 Hoffman, Rev. Eugene A., D.D. | |
| 1886 Holt, Geo. C. | 1852 Jay, Hon. John. (L. F.) |
| 1886 Hawley, E. Judson. | 1852 Jones, John D. (L. F.) |
| 1886 Hildreth, David M. | 1868 Johnson, Hezron A. |
| 1886 Hinds, Joseph E. | 1871 Jones, Walter R. T. |
| 1886 Hitchcock, Bradford W. | 1874 Judson, Wm. D. |
| 1886 Hillhouse, Thomas G. | 1874 Janssen, Gerhard. |
| 1887 Hinchman, Walter. | 1874 Jesup, M. K. (L. F.) |
| 1887 Hastings, Prof. Thos. S., D.D. | 1874 Jaffray, Edward S. |
| 1887 Huntington, Geo. S., M.D. | 1874 Jenkins, Wm. L. |
| 1887 Hague, James D. | 1874 James, D. Willis. |
| 1887 Hurd, S. H., M.D.,
Skaneateles, N. Y. | 1874 Jameson, Joseph A. |
| 1887 Hunker, Lieut. J. J., U.S.N. | 1874 Jaffray, Robert. |
| 1887 Horsford, Prof. E. N.,
Cambridge, Mass. | 1879 Jay, William. |
| 1887 Hunter, James B. | 1880 Jewett, George L. |
| 1887 Hopping, A. Howard. | 1881 Jewett, Hugh J., Glenville, Md. |
| 1887 Hayes, Richard Somers. | 1881 Johnson, Bradish, Jr. |
| 1887 Howell, Theodore D. | 1882 Jasper, John. |
| 1887 Hodgman, George F. | 1883 Judson, A. M. |
| 1887 Hill, James K. | 1885 Juilliard, A. D. |
| 1887 Hoadly, Hon. George. | 1886 Janeway, Henry L.,
New Brunswick, N. J. |
| 1887 Holbrook, Edward. | 1886 Jacobi, A., M.D. |
| 1888 Henderson, John C. | 1886 Jennings, O. B. |
| 1888 Hard, Anson W. | 1886 Jackson, Rev. Samuel M. |
| 1888 Hoyt, Henry R. (L. F.) | 1886 Janvrin, J. E., M.D. |
| 1888 Hyde, John, Hyde Park, Ill. | 1887 Jenkins, Augustus S. |
| 1888 Hathaway, Horatio,
New Bedford, Mass. | 1888 Jones, Oliver L. (L. F.) |
| | 1888 Jeffries, W. Lloyd, Boston, Mass. |
| | 1888 Jackson, Oswald. |
| | 1888 Johnson, George F. |

- 1888 Jarvis, S. M., Kansas City, Mo.
 1869 Kelly, Eugene.
 1870 Kühne, Frederick.
 1872 Kendrick, Col. H. L., U.S.A.
 1873 Kennan, George,
 Washington, D. C.
 1874 King, Edward.
 1874 Kearny, Joseph R.
 1874 Kunhardt, Henry R.
 1874 Kingsland, Wm. M. (L. F.)
 1874 Kalbfleisch, Charles H.
 1874 Keck, Thomas.
 1876 Knauth, Percival. (L. F.)
 1877 King, Clarence. (L. F.)
 1878 Kernochan, James Lorillard.
 (L. F.)
 1879 Kane, S. Nicholson.
 1880 Keene, James R. (L. F.)
 1881 Kennedy, John S. (L. F.)
 1881 Kane, Grenville. (L. F.)
 1881 Kirsch, Louis, Brooklyn, N. Y.
 1882 King, Le Roy.
 1882 King, George Gordon.
 1882 King, Vincent C. (L. F.)
 1883 Kneeland, Henry T.
 1883 Klutschak, Henry W.
 1883 Knapp, S. P.
 1883 Kohn, Julius A.
 1883 Kerr, Walter.
 1883 King, D. H., Jr.
 1884 Kountze, Augustus. (L. F.)
 1884 Kahn, Dr. Hermann.
 1885 Keane, Joseph.
 1885 Knapp, Samuel T., Jr.
 1885 Keppler, Rudolph. (L. F.)
 1886 Kurtz, William.
 1886 Kendall, Edward H.
 1886 Kidder, Camillus G. (L. F.)
 1886 Karner, W. J., Chicago, Ill.
 1887 Knevals, Caleb B.
 1887 Knudson, Morris F.
 1887 Knight, George T.
 1887 Kevan, William.
 1887 Knox, John Jay.
 1888 Kelly, Edward. (L. F.)
 1888 Kissel, Gustav E.
 1888 Knox, Herbert H.
 1888 Kellogg, Charles, Athens, Pa.
 1888 Kennedy, Harvey.
 1888 Kennedy, H. Van Rensselaer.
 1852 Livingston, Cambridge. (L. F.)
 1857 Low, Abiel A. (L. F.)
 1859 Lathers, Richard. (L. F.)
 1868 Lawrence, Hon. Abraham R.
 1869 Lawrence, John S. (L. F.)
 1870 Loew, Hon. Frederick W.
 1870 Lyman, Edward H. R.
 1871 Letson, Robert S.
 1871 Larremore, Richard L., I.L.D.
 1872 Libbey, William. (L. F.)
 1874 Lauterbach, Edward.
 1874 Livingston, Robert J. (L. F.)
 1874 Langdon, Walter, (L. F.),
 Hyde Park, N. Y.
 1874 Lorillard, Pierre.
 1874 Livingston, Robert E.
 1874 Littlejohn, James, Brooklyn, N. Y.
 1874 Lawton, Walter E.
 1874 Lawrence, Joseph B.
 1874 Le Comte, Joseph.
 1874 Lewis, Walter H.
 1874 Lawson, Leonidas M.
 1874 Leshner, Stephen R.
 1875 Low, Hon. Seth, (L. F.)
 1875 Lawrence, George N.
 1876 Low, A. Augustus. (L. F.)
 1878 Loubat, J. F., I.L.D. (L. F.)
 1878 Leon, Nestor Ponce de.
 1879 Levy, Augustus H.
 1880 Lang, Alexander.
 1880 Lee, William H.
 1881 Libbey, Prof. William, Jr., (L. F.),
 Princeton, N. J.
 1881 Langdon, Woodbury G. (L. F.)
 1881 Little, Joseph J. (L. F.)
 1881 Livermore, Edwin R.
 1881 Lee, J. Bowers.
 1882 Lambert, Edward.

- 1882 Langdon, Woodbury.
 1882 Lamont, Lansing.
 1882 Le Roy, Herman R.
 1882 Lapham, Lewis H.
 1882 Lamborn, Robert H.
 1883 Lourie, J.
 1883 Lummis, William.
 1883 Lounsbery, R. P.
 1886 Leete, C. H.
 1886 Ludington, C. H. (L. F.)
 1886 Lee, Wm. H. L.
 1887 Lord, Daniel, Jr.
 1887 Littlefield, Frederick M.
 1887 Langmann, G., M.D.
 1887 Lewis, James F.
 1887 Lester, Henry M.
 1887 Logan, Walter S.
 1887 Lodge, Hon. Henry Cabot,
 Boston, Mass.
 1887 Lovell, John W.
 1887 Loomis, Alfred L., M.D.
 1887 Lee, Homer.
 1888 Lespinasse, George S.
 1888 Lancaster, R. A.
 1888 Lynch, James D. (L. F.)
 1888 Lawton, James M.
 1888 Lawson, James.
 1853 Moore, George H. (L. F.)
 1856 Monroe, Ebenezer, Southport, Ct.
 1859 MacMullen, Prof. John.
 1859 Morrell, Wm. H. (L. F.)
 1859 Moore, Frank. (L. F.)
 1863 May, Lewis.
 1863 Moore, W. H. H. (L. F.)
 1864 Morton, Hon. Levi P. (L. F.)
 1868 Morrison, Henry.
 1868 Martin, Isaac P.
 1868 Marquand, Henry G. (L. F.)
 1869 Moore, Henderson.
 1870 Marbury, Francis F.
 1872 Meyer, F. William.
 1872 Marié, Peter. (L. F.)
 1873 Moore, C. B.
 1874 Morris, Henry L. (L. F.)
 1874 Marble, Manton.
 1874 Morgan, W. F.
 1874 Moir, James.
 1874 Morgan, J. Pierpont. (L. F.)
 1874 Myers, John K., Yonkers, N. Y.
 1874 McAlpin, David H.
 1874 Merrill, William J. (L. F.)
 1874 Moulton, Clarence F.
 1875 Mitchell, Edward.
 1875 Macy, Arthur C. E.,
 Silver King, Arizona.
 1875 Marcus, Arnold.
 1875 Monheimer, Joseph A.
 1875 Magoun, George C.
 1875 Maclay, Moses B.
 1875 Martin, Bradley. (L. F.)
 1875 Meyer, L. H.
 1875 McLanahan, Geo. William.
 1876 Mitchell, W. Howard,
 1877 Matsell, George W.,
 Anamosa, Iowa.
 1878 Musgrave, Thomas B. (L. F.)
 1878 Mason, Lieut. T. B. M., U.S.N.
 (L. F.)
 1879 Marshall, William I., Chicago, Ill.
 1879 Mather, Frederick E.
 1879 Motz, Ferdinand.
 1879 Miller, John Bleeker.
 1879 Monteith, James.
 1880 Mills, D. O. (L. F.)
 1880 Massey, Wm. M.
 1882 Marquand, John P.
 1882 Marsh, Caleb P.
 1882 McWilliam, John.
 1882 Moore, W. T.
 1882 Mead, Erastus F.
 1882 Markoe, F. H., M.D. (L. F.)
 1883 Marvel, William D.
 1883 Mackay, Donald. (L. F.)
 1883 McCreery, James. (L. F.)
 1883 Morgan, E. D.
 1883 Mali, Charles.
 1884 Moore, Joseph, Jr., (L. F.),
 Philadelphia, Pa.
 1884 Myers, Andrew G.

- 1884 MacKellar, Wm. (L. F.)
 1885 Mackenzie, D. E.
 1885 Morison, George S.
 1886 Muñoz, J. M. (L. F.)
 1886 Murray, James B.
 1886 Moore, John G.
 1886 Moses, Raphael J., Jr.
 1886 Manierre, Charles E.
 1886 Miner, H. C.
 1886 Macklin, John J.
 1886 Morgan, N. Denison.
 1886 MacFarland, James.
 1887 Morgan, Wm. Fellowes. (L. F.)
 1887 Malcolm, William L.
 1887 Mitchell, Hubbard W., M.D.
 1887 Metcalfe, John T., M.D.
 1887 Macy, Isaac A.
 1887 McCourt, P. J., M.D.
 1887 Mack, Jacob W.
 1887 Mott, Alexander B., M.D.
 1887 Mali, Henry W. T.
 1887 Meyer, Alfred, M.D.
 1887 Moulton, Franklin W.
 1887 Montgomery, Warwick E.
 1887 McCready, N. L.
 1887 Morton, Alexander L.
 1888 Marquand, Henry. (L. F.)
 1888 Morgan, Rev. D. Parker.
 1888 Montant, Jules A.
 1888 Mason, Alex. T. (L. F.)
 1888 Malcolm, Chas. E.
 1888 Moss, Mrs. J. Osborne.
 1888 Mayo, Dr. Wm. Starbuck.
 1888 Myers, Theodore W.
 1888 Milhau, Gen. John J.
 1888 Mather, Samuel, Cleveland, O.
 1888 Mead, Edwin, Jr.
 1888 McGill, Geo. W.,
 Riverdale-on-Hudson, N. Y.
 1888 Moore, Cary W.
 1888 Martin, Oswald J. (L. F.)
 1888 McGee, James, Plainfield, N. J.
 1888 McKeever, J. Lawrence.
 1874 Newell, John, (L. F.), Chicago, Ill.
 1874 Niles, William W.
 1880 Nelson, William.
 1882 Nisbet, John L.
 1882 Naylor, Joseph.
 1882 Nelson, Richard.
 1883 Noble, Charles C. (L. F.)
 1884 Neumoegen, B.
 1884 Newberry, Dr. John S.
 1885 Nelson, Rev. George Francis.
 1886 Neilson, James,
 New Brunswick, N. J.
 1886 Notman, John.
 1886 Neftel, W. B., M.D. (L. F.)
 1887 Neels, John N.
 1887 Noyes, William C.
 1874 Ottendorfer, Oswald. (L. F.)
 1874 Olyphant, Robert M.
 1874 Owen, Frederick N.
 1875 Otterbourg, Marcus.
 1875 Ottiwell, John D.
 1875 O'Connor, Thomas H. (L. F.)
 1875 Opdyke, William S. (L. F.)
 1876 Olmstead, Dwight H.
 1877 O'Gorman, Hon. Richard.
 1879 O'Gorman, Richard, Jr.
 1879 O'Brien, Thomas S.
 1880 O'Shaughnessy, John W. (L. F.)
 1881 Oakley, Henry A.
 1882 Osborn, W. H. (L. F.)
 1882 Openheim, Edward L.
 1882 Osgood, William H.
 1882 Otis, Col. Charles G.,
 Brooklyn, N. Y.
 1883 O'Donohue, Jos. J.
 1886 O'Brien, Morgan J.
 1887 Oldham, J. Leslie.
 1887 Ogden, William B. (L. F.)
 1888 Oakes, T. E., St. Paul, Minn.
 1852 Poor, Henry V. (L. F.)
 1855 Pierrepont, Hon. Edwards.
 1857 Pyne, Percy R. (L. F.)
 1859 Purser, George H.
 1862 Phillips, George W.

- 1868 Powers, William P.
 1868 Paulison, John P.
 1871 Peabody, Hon. Charles A.
 1872 Parish, Henry. (L. F.)
 1874 Peabody, Arthur J.
 1874 Penfold, William Hall.
 1874 Potter, Hon. Orlando B.
 1874 Pondir, John.
 1874 Paris, Sherman.
 1874 Porter, John K.
 1874 Packer, Elisha A.
 1874 Powers, George J.
 1874 Pellew, Henry E., Katonah, N.Y.
 1874 Prichard, William M.
 1875 Prentice, W. P.
 1875 Pfund, Anton.
 1875 Porter, Gen. Horace.
 1876 Plum, James R.
 1878 Parsons, Edwin.
 1880 Pinchot, James W.
 1880 Powell, Wilson M.
 1881 Post, Charles A.
 1882 Parsons, Wm. (L. F.)
 1882 Perkins, C. Lawrence.
 1882 Parrish, James C. (L. F.)
 1882 Pell, Wm. Cruger.
 1882 Parsons, Joseph H.
 1882 Percival, James H.
 1882 Parsons, Samuel.
 1882 Paton, John.
 1882 Platt, Thos. C.
 1882 Peck, Walter J.
 1882 Parsons, John E.
 1882 Parsons, Charles.
 1882 Peck, Charles M.
 1882 Parsons, Mrs. E. (L. F.)
 1883 Parks, Robert H. (L. F.)
 1884 Post, George B.
 1884 Place, George.
 1884 Purdy, John F.
 1884 Plush, Dr. Samuel M., (L. F.)
 Philadelphia, Pa.
 1885 Post, Wm. Henry. (L. F.)
 1885 Parker, George A.
 1885 Planter, J. R. (L. F.)
 1885 Pell, Charles E.
 1886 Phoenix, Phillips. (L. F.)
 1886 Pearson, Henry G.
 1886 Pearsall, T. W.
 1886 Pryer, Chas., New Rochelle, N.Y.
 1886 Pings, Geo. H.
 1886 Parris, Edward L.
 1887 Phoenix, Lloyd. (L. F.)
 1887 Perdicaris, Ion.
 1887 Peaslee, Wyllys G.,
 Dubuque, Iowa.
 1887 Peters, George A., M.D.
 1887 Parsons, William H.
 1887 Putney, Daniel.
 1887 Pearson, Frederick.
 1887 Peters, Samuel T.
 1887 Parsell, Henry V.
 1888 Post, H. A. V.
 1888 Parsons, John H.
 1888 Peabody, Joseph, Boston, Mass.
 1888 Perry, William A.
 1888 Paine, Robert Treat, Boston, Mass.
 1888 Phillips, Wm. D.
 1888 Prescott, Geo. B.
 1888 Paddock, Hon. A. S.,
 Beatrice, Neb.
 1883 Quackenbos, John D., M.D.
 1883 Quinlin, Leonard G.
 1885 Quinby, J. R.
 1887 Quinlan, James.
 1854 Rutherford, L. M.
 1856 Randolph, Anson D. F.
 1856 Remsen, William. (L. F.)
 1856 Riker, John H.
 1861 Rogers, C. B. (L. F.)
 1868 Raven, Anton A. (L. F.)
 1868 Rose, Cornelius.
 1872 Robbins, Chandler. (L. F.)
 1874 Reid, Whitelaw.
 1874 Richard, Auguste. (L. F.)
 1874 Rogers, H. Livingston.
 1874 Riker, William J.
 1874 Reynes, Jaime

- 1874 Rhoades, John H.
 1875 Roosevelt, Clinton.
 1875 Read, Gen. Meredith., (L. F.)
 Paris, France.
 1875 Rose, Charles.
 1876 Ross, William B.
 1877 Rice, A. Thorndike.
 1878 Roorbach, Orville A.
 1878 Rainey, Thomas, M.D.,
 Ravenswood, N. Y.
 1879 Rhinelander, Miss J. (L. F.)
 1880 Robinson, Mrs. John A. (L. F.)
 1881 Randolph, J. C. F.
 1881 Robbins, George A.
 1881 Rhinelander, Frederick W.
 1882 Rinehart, E.
 1882 Ray, James D.
 1882 Robbins, S. H.
 1882 Redding, W. E.
 1882 Rolston, Roswell G.
 1882 Rhinelander, Charles E.
 1882 Rathborne, C. L.
 1883 Rosenbaum, Albert S.
 1883 Richardson, Briton.
 1883 Rowland, Thomas F. (L. F.)
 1886 Raymond, R. W.
 1886 Roys, Geo. B.
 1886 Rice, Isaac L. (L. F.)
 1886 Ransom, Rastus S.
 1886 Rogers, Belden J.
 1887 Remsen, Robert Geo. (L. F.)
 1887 Ruggles, James Francis.
 1887 Robertson, R. H.
 1887 Robb, Hon. J. Hampden, (L. F.)
 1887 Read, Daniel P.
 1887 Rowell, Geo. P. (L. F.)
 1887 Rogers, Archibald. (L. F.)
 1887 Rice, Henry.
 1887 Robertson, T. S., M.D.
 1888 Russell, Henry E.
 1888 Riker, Daniel S.
 1888 Roe, Alfred
 1888 Ropes, Chas. H.
 1888 Rhinelander, Wm.
 1888 Renwick Edward S.
 1888 Richter, Dr. C. M.,
 San Francisco, Cal.
 1888 Russell, Hon. John E.,
 Leicester, Mass.
 1888 Robinson, Wm. M.
 1888 Reiley, Robt. T.
 1856 Spofford, Paul N.
 1856 Schermerhorn, Wm. C.
 1856 Sherman, W. Watts.
 1859 Schultz, John H. (L. F.)
 1860 Stout, Francis A. (L. F.)
 1869 Strebeigh, Robert M.
 1870 Sherwood John.
 1870 Schafer, Samuel M.
 1870 Schafer, Simon.
 1870 Seligman, James.
 1870 Seligman, Jesse.
 1871 Shaler, Gen. Alexander.
 Ridgefield, N. J.
 1871 Swan, William H.
 1872 Stern, Myer.
 1872 Steiger, E.
 1872 Stuyvesant, Rutherford. (L. F.)
 1873 Sturges, Frederick.
 1873 Spencer, James C.
 1873 Scott, Julian. (L. F.)
 Plainfield, N. J.
 1873 Southworth, Alvan S. (L. F.)
 1873 Sturgis, Frank K. (L. S.)
 1874 Sands, Henry M.
 1874 Steinway, William.
 1874 Sloan, Samuel.
 1874 Schermerhorn, F. Augustus
 (L. F.)
 1874 Stuyvesant, Robert R.
 1874 Stuart, Joseph.
 1874 Strong, W. L. (L. F.)
 1874 Steward, D. Jackson.
 1874 Shethar, Samuel,
 1874 Schieffelin, Samuel B.
 1874 Stillwell, Benjamin M.
 1874 Sawyer, Warren, Boston, Mass.
 1874 Sands, Andrew H.
 1874 Schaus, William.

- 1874 Spinney, Joseph S.
 1874 Striker, J. A.
 1875 Stanford, William H.
 1875 Smith, Lewis Bayard.
 1875 Sturges, Henry C.
 1875 Stewart, Col. Charles Seaforth,
 Cooperstown, N. Y.
 1875 Schultz, Carl H.
 1875 Sandford, Elliott. (L. F.)
 1875 Stranahan, J. S. T.,
 Brooklyn, N. Y.
 1875 Schieffelin, H. Maunsell.
 1875 Schiff, Jacob H. (L. F.)
 1875 Smith, Augustine.
 1876 Smith, Harsen H.
 1876 Sibley, Hiram W. (L. F.)
 1876 Spaulding, Henry F.
 1876 Stryker, Gen. William S.,
 Trenton, N. J.
 1876 Stone, Andros B., Chicago, Ill.
 1877 Shearman, William P. (L. F.)
 1877 Sanford, Gen. Henry S.,
 Birmingham, Ct.
 1877 Sanger, Major Joseph P., U.S.A.,
 Governor's Island, N. Y.
 1877 Schaff, Rev. Philip, D.D.
 1877 Schuyler, Philip.
 1878 Stewart, William Rhineland.
 1878 Sands, William R. (L. F.)
 1878 Smith, S. Newton.
 1878 Sabla, Theodore de Joly de.
 1879 Stone, R. C.
 1879 Stevens, Frederic W. (L. F.)
 1879 Smith, E. Reuel. (L. F.)
 1879 Smith, Herbert H.,
 Brooklyn, N. Y.
 1879 Shields, Prof. Charles W.,
 Princeton, N. J.
 1879 Stetson, Francis Lynde.
 1879 Squires, Grant.
 1880 Southwick, Henry K. (L. F.)
 1882 Sass, Dr. Luis F.
 1882 Schuyler, Spencer D. (L. F.)
 1882 Samson, Felix.
 1882 Sayre, Lewis A., M.D. (L. F.)
 1882 Scott, George S.
 1882 Skidmore, Wm. L..
 1882 St. John W. P.
 1882 Scribner, Charles.
 1883 Schermerhorn, Charles A.
 1883 Simpson, George E.
 1883 Stone, Sumner R.
 1883 Sinclair, John. (L. F.)
 1883 Spence, Lewis H.
 1883 Smith, William Alex.
 1883 Smith, Henry N.
 1883 Stern, Louis.
 1883 Schwenniger, Rev. Anton B.
 1883 Sanger, Wm. Cary.
 1883 Scott, Rufus L.
 1883 Sorzano, Julio F.
 1883 Spicer, Elihu, Jr. (L. F.)
 1884 Schley, J. Montfort, M.D.
 1884 Schwatka, Lieut. F.,
 Rock Island, Ill.
 1884 Shannon, Robert H.
 1884 Stokes, James.
 1885 Storer, Albert.
 1885 Sturgis, Russell.
 1885 Slote, Henry L.
 1885 Stanton, S. Franklin.
 1885 Storm, Walton.
 1885 Schmelzel, Wm. R.
 1886 Stevens, Rev. C. Ellis, L.L.D.
 1886 Sherman, Prof. O. T.,
 Baltimore, Md.
 1886 Sherman, George.
 1886 Schuyler, Geo. L..
 1886 Starr, Egbert.
 1886 Satterlee, F. Le Roy, M.D.
 1886 Sturgis, F. R., M.D.
 1886 Smith, Edwin B.
 1886 Snead, Thomas L.
 1887 Stewart, Lisperand.
 1887 Sutton, Rev. J. Ford, D.D.
 1887 Schell, Robert.
 1887 Seessel, A., M.D.
 1887 Swain, George F., Passaic, N. J.
 1887 Sawyer, Lieut. J. Estcourt,
 Governor's Island, N. Y.

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|---|---|
| 1887 Seligman, Dewitt J. | 1875 Taintor, Charles M. |
| 1887 Smith, Jas. Rufus. | 1875 Terry, Gen. Alfred H., U.S.A. |
| 1887 Smith, Nathaniel S. | 1875 Toel, William. |
| 1887 Sellew, T. G. | 1875 Terbell, Henry S. |
| 1887 Satterthwaite, Thos. E., M.D. | 1876 Terry, Rev. Roderick. |
| 1887 Stetson, George W. (L. F.) | 1877 Tillinghast, William H. |
| 1887 Satterlee, S. K. | 1877 Talcott, James. (L. F.) |
| 1887 Sterry, George E. | 1879 Turnbull, Robert J.,
Morristown, N. J. |
| 1887 Shortall, John G., Chicago, Ill. | 1880 Tailer, William H. |
| 1887 Serrell, Gen. Edward W. | 1881 Thompson, R. H., Troy, N. Y. |
| 1887 Stickney, Austin. | 1882 Thurber, H. K. |
| 1887 Stevens, George T. | 1882 Taber, Henry M. (L. F.) |
| 1888 Stephens, Benjamin. | 1882 Thomson, Eugene. |
| 1888 Stickney, Albert. | 1882 Tailer, Edward N. (L. F.) |
| 1888 Stuart, Inglis. | 1882 Terry, John T. (L. F.) |
| 1888 Smith, Nelson. | 1882 Taintor, Giles E. |
| 1888 Sprague, Henry E. | 1883 Twombly, Hamilton McK. |
| 1888 Salisbury, Stephen. (L. F.),
Worcester, Mass. | 1883 Trumbull, Rev. H. Clay, D.D.,
Philadelphia, Pa. |
| 1888 Smith, A. Cary. | 1883 Thalmann, Ernest. |
| 1888 Stott, Frank H., (L. F.),
Stottville, N. Y. | 1883 Terry, Edmund. |
| 1888 Starbuck, Wm. H. | 1884 Taltavall, Wm. A. |
| 1888 Smythe, Rev. Hugh. | 1884 Turner, J. Spencer. |
| 1888 Sheldon, Edwin B., Chicago, Ill. | 1884 Thoron, Joseph. |
| 1888 Schell, Edward. | 1885 Tone, T. Wolfe. |
| 1888 Skiddy, Wm. W.,
Stamford, Conn. | 1885 Tiffany, Rev. C. C., D.D. |
| 1888 Shipman, Charles M.,
Jersey City. | 1885 Turnure, Lawrence. |
| 1888 Sherman, Charles A. | 1886 Thorne, Jonathan. |
| 1888 Shultz, John S. | 1887 Turnbull, William. |
| 1888 Sturgis, Robert. | 1887 Tower, David A. |
| 1856 Tiffany, Charles L. | 1887 Talbot, Charles, N. |
| 1856 Townsend, Randolph W. | 1887 Ten Eyck, Sandford R. |
| 1868 Taylor, Douglas. | 1887 Talmadge, Henry. |
| 1870 Tuckerman, Lucius. | 1887 Thompson, Frederic F. (L. F.) |
| 1870 Thomson, James. | 1887 Townsend, Howard. |
| 1872 Tower, Gen. Z. B., U.S.A. | 1888 Taber, Horace M. |
| 1874 Thompson, David G. (L. F.) | 1888 Thompson, W. Gilman, M.D. |
| 1874 Tiemann, Peter C. | 1888 Twombly, Horatio N. |
| 1874 Trevor, John B. | 1888 Tompkins, Wm. W. |
| 1874 Taylor, Alfred J. | 1888 Tresidder, John R. |
| 1874 Turner, Herbert B. | 1888 Taylor, C. Fayette, M.D. |
| | 1884 Utter, Dr. Francis A. |
| | 1888 Uhl, Edward. (L. F.) |

- 1854 Viele, Gen. Egbert L.
 1868 Van Santvoord, C.
 1870 Van Brunt, Hon. Charles H. (L. F.)
 1874 Van Rensselaer, Kilian.
 1875 Van Buren, John D.
 1875 Valentine, Lawson.
 1875 Von Post, H. C. (L. F.)
 1875 Vanderpoel, A. Ernest.
 1876 Van Hoesen, Hon. George M.
 1876 Van Brunt, Cornelius.
 1877 Vanderbilt, Cornelius. (L. F.)
 1878 Vanderbilt, William K. (L. F.)
 1880 von Hesse, Christian.
 1881 Vantine, A. A.
 1883 Van Sinderen, Adrian.
 1884 Van Siclen, Geo. W.
 1885 Valentine, Henry C.
 1886 Valenzuela, Enrique.
 1887 Voorhees, Charles H., M.D.,
 New Brunswick, N. J.
 1887 Van Alen, J. J. (L. F.)
 1887 Van Slyck, Geo. W. (L. F.)
 1887 Verastigui, Alberto,
 Havana, Cuba.
 1887 Voorhees, Philip R.
 1888 Villard, Henry.
 1888 Ver Planck, Wm. G.
 1888 Vail, Theodore N.

 1854 Webb, William H.
 1854 Witthaus, G. H. (L. F.)
 1866 Wendell, Jacob. (L. F.)
 1868 White, Alexander M.
 1870 Webster, Sidney.
 1870 Wilson, Gen. Jas. Grant. (L. F.)
 1870 Wright, E. Kellogg.
 1870 Ward, T. W.
 1872 Wetmore, Wm. Boerum, (L. F.)
 Shelburne, Vt.
 1872 Wells, Jacob.
 1873 Wiener, Joseph, M.D., (L. F.)
 1874 Weyman, Charles S.
 1874 Wheeler, Everett P.
 1874 Wetmore, Hon. George P. (L. F.)
 1874 Walraven, Ira E., Philadelphia, Pa.

 1875 Work, J. Henry.
 1875 White, Charles Trumbull.
 1875 Wilcox, Franklin A.
 1875 White, David,
 Ft. Montgomery, N. Y.
 1875 Winslow, Gen. Edward F.
 1875 Whitehead, Comdr. Wm., U.S.N.
 1875 White, Loomis L.
 1876 Wedemeyer, A. J. D.
 1877 Ward, W. S., Denver, Colo.
 1877 Waters, James T.
 1877 Woodruff, Col. D., U.S.A.,
 Trenton, N. J.
 1878 Whitehead, Henry M.
 1878 Whittemore, Charles.
 1879 Watson, Francis A. (L. F.)
 1879 Williams, Richard P.
 1880 Wilson, James.
 1881 Wilson, John.
 1881 Whitehouse, Frederic Cope.
 1882 Wadsworth, John H.
 1882 Waddingham, Wilson. (L. F.)
 1882 Williams, David. (L. F.)
 1882 Winthrop, Robert. (L. F.)
 1883 Wilson, Theodore.
 1884 Wheelwright, Wm. D.
 1884 Watson, George H. (L. F.)
 1884 Wood, Wm. H. S.
 1884 Walcott, Joseph C.
 1886 Wright, Wm. Phillips.
 1886 Walsh, Richard M. L.
 1886 White, S. V. (L. F.)
 1886 Wiman, Erastus.
 1886 Walker, John A.
 1886 Willets, Edward B.
 1886 Whitehouse, J. H.
 1886 White, Horace.
 1886 Wales, Salem H.
 1886 Watson, Wm. P.
 1886 Ward, John E.
 1887 White, Julian LeRoy.
 1887 White, William Aug.
 1887 White, Alfred T.
 1887 Wilson, J. Wall.
 1887 Wheelock, George G., M.D.

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|---------------------------------|-----------------------------------|
| 1887 White, Andrew J. | 1888 Woodward, Jas. T. (L. F.) |
| 1887 White, Henry, London, Eng. | 1888 Wendell, Ten Eyck. |
| 1887 Whitely, James. | 1888 Worthington, Robt. H. |
| 1887 Wilcox, Stephen. | 1888 Wood, Charles B. |
| 1887 Wisner, William H. | 1888 Wolfe, Dr. S. B. |
| 1887 Westcott, Clarence L. | 1888 Wetmore, Edmund. |
| 1887 Welling, W. Brenton. | 1888 Winslow, Daniel. |
| 1888 West, Hon. George. | |
| Ballston Spa, N. Y. | 1874 Young, Mason. |
| 1888 Whitehouse, W. Fitzhugh. | 1888 Young, Edward F. C., |
| 1888 Wynkoop, Francis S. | Jersey City, N. J. |
| 1888 Walsh, F. Y. | |
| 1888 Witherbee, Frank S. | 1875 Zollikoffer Oscar. |
| 1888 Wynkoop, G. H., M.D. | 1884 Zabriskie, Andrew C. (L. F.) |
| 1888 West, Frederick T. | 1886 Zucker, Alfred. |

FELLOWS DECEASED, 1888.

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|---------------------------------------|--------------------------------|
| Chas. G. Havens, Jan. 7. | Courtlandt Palmer, July 23. |
| Theo. Houston, Jan. 13. | Christopher Meyer, July 31. |
| Chas. A. Decker, Jan. 28. | I. N. Phelps, Aug. 1. |
| John Green, Jan. 30. | Wm. H. Inman, Aug. 19. |
| Romaine Dillon, Feb. 4. | Rich'd A. Elmer, Oct. 1. |
| Geo. W. Cass, March 21. | Francis W. Williams, Oct. 8. |
| Chief-Justice M. R. Waite, March 23. | John Savage, Oct. 10. |
| David D. Acker, March 23. | A. Wright Sanford, Oct. 19. |
| Hon. John T. Hoffman, March 24. | Chas. H. Phillips, Oct. 29. |
| Joseph W. Drexel, March 25. | L. J. N. Stark, Nov. 6. |
| Henry E. Pierrepont, March 28. | Frederic A. Potts, Nov. 9. |
| Gen. Q. A. Gillmore, U.S.A., April 7. | Erastus T. Tefft, Nov. 10. |
| Geo. H. Jones, April 14. | John H. Kneeland, Nov. 13. |
| Wm. B. Dinsmore, April 20. | Admiral C. H. Baldwin, U.S.N., |
| John B. Dash, May 11. | Nov. 17 |
| Chas. T. Wing, May 24. | John Elliott, Dec. 5. |
| Lieut.-Comdr. Geo. M. Totten, U.S.N. | Edward S. Dakin, Dec. 6. |
| T. Garrett Harrison, June 8. | Townsend Smith, Dec. 23. |
| Col. T. Bailey Myers, June 16. | August Aufermann. |

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ALASKA :

Alaskan Society of Natural History and Ethnology, Sitka.

ARGENTINE REPUBLIC :

Academia Nacional de Ciencias, Córdoba

Instituto Geográfico Argentino, Buenos-Aires.

Instituto Histórico-Geográfico del Rio de la Plata, Buenos-Aires.

Sociedad Geográfica Argentina, Buenos-Aires.

AUSTRALIA :

Department of Mines, Sydney, N. S. W.

Linnean Society of New South Wales, Sydney, N. S. W.

Royal Society of New South Wales, Sydney, N. S. W.

Royal Society of Queensland, Brisbane, Queensland.

Melbourne Observatory, Melbourne, Victoria.

Royal Society of Victoria, Melbourne, Victoria.

AUSTRIA :

Ferdinandeam, Innsbruck.

Gesellschaft der Wissenschaften, Prague.

K. K. Akademie der Wissenschaften, Vienna.

K. K. Geographische Gesellschaft, Vienna.

K. K. Geolog. Reichsanstalt, Vienna.

K. K. Naturhist. Hofmuseum, Vienna.

K. K. Militär-Geographisches Institut, Vienna.

BELGIUM :

Société Belge de Géographie, Antwerp.

Académie Royale de Belgique, Brussels.

Institut National de Géographie, Brussels.

Le Mouvement Géographique, Brussels.

Société Royale Belge de Géographie, Brussels.

BRAZIL :

Bibliotheca Nacional, Rio de Janeiro.

Instituto Historico, Geographico, e Ethnographico do Brazil, Rio de Janeiro.

Museu Nacional, Rio de Janeiro.

Observatorio, Rio de Janeiro.

Secção da Sociedade de Geographia de Lisboa no Brazil, Rio de Janeiro.

Sociedade de Geographia, Rio de Janeiro.

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Geographical Society of the Pacific, San Francisco.

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University of California, Berkeley.

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Geological and Natural History Survey of Canada, Ottawa.
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Sociedad Mexicana de Geografía y Estadística, Mexico.

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Historical and Geological Society of Wyoming, Wilkesbarre.
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 Comissão Central Permanente de Geographia, Lisbon.
 Sociedade de Geographia, Lisbon.

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5, 1887; Proceedings, 8 Nos. 1886-1887; Törten. Tudományok K., Vol. XIII, Nos. 2, 4, 5; Ethnologische Mitteilungen aus Ungarn, I Jahr, I Heft, 1887; Archæologiai Közlemények, Vol. XV, 1886; Annuaire, XVII, 4, 1886; Monumenta Comititalia Transylvaniae, 1886; Aperçus Politiques et Corr. de Jean Rimaý, 1887; L'Infraction Consommée, 1887; Diplomaticae Relationes Gabrielis Bethlen cum Venetorum Republica, 1886; Codex Diplomaticus Hungaricus Andegavensis, (1347-1352), 1887; La Famille du Comte de Berce-ényi, 1887; L'Election d'Etienne Báthory, 1887; Defters du Fisc Turc en Hongrie, 1886.

From Lewis M. Haupt, Author:

The Physical Phenomena of Harbor Entrances, Philadelphia, 1887.

From the Italian Government:

Bollettino delle Pubblicazioni Ital. Ricevute per Dir. di Stampa, Nos. 48-71, and Tavola Sinottica, 1888; Movimento della Navigazione, 2 parts, 1887; Statistica del Commercio di Importazione e di Esp., 13 parts, 1887-1888; Legislazione e Statistica Doganale, 13 parts, 1887-1888; Ministero di Agricoltura, Industria e Commercio, 17 publications, 1887-1888; Direzione Generale di Statistica, 4 publications, 1880-1886.

From Dr. S. Kneeland:

Uebersichts-Skizze des Uëlle-Stromgebietes, Gotha, 1888.

From Mr. T. H. Lambert:

Discovery of the Origin of the Name of America, by Thomas de St. Bris, New York, 1888.

From Mr. Juan M. Larsen, Buenos Aires:

Arte y Vocabulario de la Lengua Lule y' Toconoté, por Antonio Machoni de Cerdeña, S. J., Buenos Aires, 1878; Gramática Araucana, ó sea Arte de la lengua de Chile, por P. Andres Febrés, S. J., Buenos Aires, 1884; Diccionario Araucano-Español por P. Andres Febrés, S. J. Buenos Aires (reprint of Lima edition, 1765), 1883.

From W. von Landau, Author:

Travels in Asia, Australia, and America, Pts. 1 and 2, New York, 1888.

From Prof. Jules Marcou, Author, Cambridge, Mass.:

Nouvelles Recherches sur l'Origine du Nom d'Amérique, Paris, 1888.

From the Minnesota Historical Society, St. Paul:

Catalogue of the Library of the Minnesota Historical Society, 2 Vols., St. Paul, 1888.

From Prince Albert de Monaco, Paris:

Deuxième Campagne Scientifique de l' *Hirondelle*, Paris, 1887 : Sur une Expérience entreprise pour, etc., 2^{me} Camp. de l' *Hirondelle*, Paris, 1887 ; Sur les Résultats Partiels des deux Campagnes, etc., Paris, 1887 ; Sur la Troisième Campagne de l' *Hirondelle*, Paris, 1887 ; Sur des Courbes Barométriques, Paris, 1887.

From A. E. Nordenskjöld, Stockholm:

Den förska på verkliga iakttagelset grundade Karta öfver Norra Asien, Stockholm, 1887.

From Mr. R. A. Macfie, Compiler, Edinburgh, Scotland:

Copyright and Patents for Inventions, 2 vols., Edinburgh, 1879-1883.

From the Trustees of the Brooklyn Library, Brooklyn, N. Y.:

Thirtieth Annual Report of Brooklyn Library, Brooklyn, 1888.

From the Trustees of the Cooper Union, New York:

Twenty-ninth Annual Report, New York, 1888.

From the Commissioners of the State Reservation at Niagara, New York:

Fourth Annual Report of the Commissioners, (for 1887) Troy, N. Y., 1888.

From the New York State Museum, Albany, N. Y.:

Annual Reports, 1883-1886, Albany, 1884-1886.

From the German Consul-General, New York:

Jahrbuch für Bremische Statistik, Bremen, 1888.

From the American Numismatic and Archæological Society, New York:

Twenty-eighth Annual Meeting of the Am. Numismatic and Archæological Society (1886), New York, 1886.

From Mr. Albert Operti, Artist, New York:

Photograph of a Painting, "The Highest North of All Time."

From F. W. Putnam, Author:

Palæolithic Man in Eastern and Central North America, by F. W. Putnam, Cambridge, Mass., 1888.

From the Rev. Geo. E. Post, Author:

Botanical Geography of Syria and Palestine, London, n. d.

From M. M. de Peralta, Author:

El Canal Interoceánico de Nicaragua y Costa Rica, Bruselas, 1887.

From the Commissioners of the Geological Survey of Pennsylvania, Philadelphia:

Annual Report of the Geological Survey of Pennsylvania for 1886, Part III; and 3 Atlases to do., Harrisburg, 1887-1888; Annual Report Pt. IV, for 1886, and Atlas, Harrisburg, 1887; North Anthracite Coal Field, Pt. II, Harrisburg, 1888; Atlas of E. Middle Anthracite Field, Pt. II, Philadelphia, 1888.

From the State Library of Pennsylvania, Harrisburg, Pa.:

Report of Pennsylvania State College for 1886, Harrisburg, 1887; Report of Secretary for Internal Affairs, Pt. IV, Harrisburg, 1887; Report of Superintendent of Public Instruction, for 1887, Harrisburg, 1887; Report on Soldiers' Orphans, Harrisburg, 1887; Reports on Banks and Savings Institutions, Harrisburg, 1887; Report of Adjutant General, 1887, Harrisburg, 1888; Report on Agriculture, 1887, Harrisburg, 1888; Report of Auditor General, 1887, Harrisburg, 1888; Report of State Treasurer, 1887, Harrisburg, 1888; Report on Sinking Fund, 1887, Harrisburg, 1887; Report on Railroads and Canals, Pt. IV, 1887, Harrisburg, 1888; Report of Insurance Commissioner on Fire Insurance, 1887, and on Life, 1887, Harrisburg, 1888; Report on Industrial Statistics, 1887, Harrisburg, 1888; Report on Board of Charities, 1887, Harrisburg, 1888; Compendium of Laws Relating to Health, Harrisburg, 1888; Smull's Legislative Handbook, 1888, Harrisburg 1888; Report of the Inspectors of Mines, 1887, Harrisburg, 1888.

From the Prussian Government:

Zeitschrift: Preuss. Statistisch: Bureau, 1-2, 3-4, 1887; Königl: Preuss: Geologisch: Landesanstalt, Bericht: Bd. VII, 3, 4, (with Atlas), Bd. VIII, 2 (with Atlas); Jahrbuch der K. Pr. Geol. Landesanstalt für 1888; Naturwissenschaftlicher Verein der Reg. 4ter Band: 6 Jahrgang Nr. 1-6.

From Mr. J. Richmond, Toronto:

Canada Past, Present and Future, by W. H. Smith, 2 Vols., Toronto (n. d.)

From Dr. Robert Sieger, Author, Vienna:

Schwankungen der innerafrikanischen Seen, Wien, n. d.; Schwankungen der hocharmenischen Seen, Wien, 1888.

From Mr. F. A. Stout:

Report of the Commissioner of Crown Lands for the Province of Quebec, for 1885, Quebec, 1885; Map of the Dominion of Canada and part of the United States, Montreal 1883; Map of Lac St. Jean; Framed Photograph of Lake Nicaragua and line of Proposed Canal.

From Mr. James Stevenson, Author, Glasgow, Scotland:

The Arabs in Central Africa: Glasgow, 1888; Map of the Country between Lakes Nyassa and Tanganyika, London (Map by Ravenstein).

From the University of Lund, Sweden:

Sveriges Offentlige Bibliotek: Accession-Katalog, Stockholm, 1888.

From the Swedish Government:

118 Statistical Documents, Commercial, Industrial, Financial and Legislative, 1887-1888.

From Mr. J. B. Tyrrell, Toronto, Author:

Brief Narrative of the Journeys of David Thompson, Toronto, 1888.

From the State Board of Health, Nashville, Tennessee:

Bulletin, Vol. III., Nos. 1-12; Vol. IV., Nos. 1, 3, 4, 5.

From Vassar Brothers, Poughkeepsie, N. Y.:

Twenty-third Annual Catalogue of Vassar College, 1887-1888, Poughkeepsie, N. Y., 1888.

From M. Vivien de St. Martin, Paris:

Nouveau Dictionnaire de Géographie Universelle, Livr. 41.

From Van Antwerp, Bragg & Co., Cincinnati, Ohio:

The Eclectic Physical Geography, by Russell Hinman, Cincinnati, 1888.

From Gen. Egbert L. Viele:

Digest of International Law of the United States, etc., by Francis Wharton, LL.D., 3 vols., Washington, 1886.

From Mr. F. Cope Whitehouse, Author, London:

The Raiyān Reservoir (reprint from *Engineering*, Sept. 14 and 21), London, 1888.

From the Wisconsin State Historical Society, Madison, Wisconsin:

Catalogue of the Library of the Wisconsin State Historical Society, Vol. VII. (Fifth Supplement), Madison, Wisconsin, 1887:

Wisconsin Historical Collections, Vols. X. and XI., and Index, Vols. I.-X., Madison, 1888.

From Mr. J. W. Wells, New York :

Mapa del Rio Putumayo, Brazil.

From the Superintendent of the U. S. Coast and Geodetic Survey, Washington, D. C. :

Catalogue of Charts and other Publications of the Coast Survey, Washington, 1887.

From the Smithsonian Institution, Washington, D. C. :

Smithsonian Miscellaneous Collections, Vols. 31, 32, 33, Washington, 1888 ; Report of Regents for 1885, Part II., Washington, 1886.

From the Director of the U. S. Mint, Washington, D. C. :

Reports of the Director of the Mint for the years 1876, 1878, 1881-1883, 1885-1887, 8 vols., Washington, D. C. ; Reports on Production of Precious Metals for the years 1880, 1883-1886, 5 vols., Washington, D. C.

From the U. S. Land Office, Washington, D. C. :

Reports of the U. S. Land Office for the years 1877-1879, 1881-1887, (in all 10 vols.) Washington, D. C.

From the Navy Department, Washington :

Annual Report of the Smithsonian Institution for 1885, 2 vols., Washington, 1886 ; Fisheries and Fishery Industries, Section II., Washington, 1887.

From the Superintendent of the Naval Observatory, Washington :

The American Ephemeris and Nautical Almanac for 1891, Washington, 1888.

From the Superintendent of the Nautical Almanac, Washington, D. C. :

Report of the Superintendent of the Nautical Almanac to June 30, 1887.

From the Chief Signal Officer, Washington, D. C. :

Annual Report of Chief Signal Officer, Washington, 1886.

From the Attorney-General of the United States, Washington, D. C. :

Reports of the Attorney-General of the United States for the years 1886 and 1887, Washington, D. C., 1886-1887.

From the U. S. Hydrographic Office, Washington, D. C. :

Sailing Directions for the Indian Ocean, No. 85, Washington.

D. C., 1887 ; Monthly Pilot Charts of the North Atlantic for 1888, with 2 Supplements ; Limits under Fishery Treaties, 1818 and 1888 ; Navigation of the Caribbean Sea and the Gulf of Mexico, Vol. I., No. 86 ; Charts : No. 1059, Port du Moule, Gaudeloupe, No. 1010, Island of Barbadoes, 1058 Christiansted Harbor, Santa Cruz Island, 1065, Port Louis, Guadeloupe, 1046 Todos Santos Bay, Lower California, 1062 Coche Island Anchorage, Venezuela, 1043 San Quentin Bay, W. Coast Lower California, 1056 St. Pierre Harbor, Island St. Pierre, 1071 S. Atlantic Ocean, 1082 Galet Anchorage, Gaudeloupe-Désirade, 1061 Sydney, Cape Breton, 1060 Punta Arenas Anchorage, W. Coast Costa Rica, 1084, Lagoon Head Anchorage, W. Coast Lower California, 1069 Beaver Harbor, Nova Scotia, 1085 Rosario Bay and Sacramento Reef, W. Coast Lower California, 1018 Burica Point to Morro Puercos, W. Coast Central America, 968 N. E. Coast of Guiana, 1074 Canso Harbor, Nova Scotia, 1064 La Trinité Bay, Martinique, 1073 Saint François Anchorage, Gaudeloupe, 1066 Gulf of St. Lawrence and Prince Edward Island, 1076 Pictou Harbor, Gulf of St. Lawrence, 1079 Port Hood, Cape Breton, 1086 Chart of Sainte Anne Anchorage, Guadeloupe, 1008, Aspinwall, U. S. of Colombia, 1072 Chinchorro Bank, Honduras, 1087 Estanques Bay, Venezuela, 1088 Newfoundland, Fortune Bay, Harbor Breton, 1090 Gaultois and Picarré Harbors, Newfoundland, Hermitage Bay, 1089 Lamalin Anchorages, S. Coast Newfoundland, 1067 Bay of Chaleurs and Adj. Coasts, Gulf of St. Lawrence, 1075 Guysborough Harbour, Nova Scotia, 1077 Cardigan Bay, Pr. Edward's Island, Gulf of St. Lawrence, 1091 Cow Head Harbor and White Rock Bay, W. Coast Newfoundland, 1092, Magdalen Islands, Gulf of St. Lawrence, 1080 Bedeque Harbor, Pr. Edward's Island, Gulf of St. Lawrence, 1093 Despair Bay, Great Jarvis Harbor, Newfoundland, 1078 Twillingate (Toulinguet) Harbors, Newfoundland, 1094 Pugwash Harbor, Nova Scotia, No. 94 Fangaloo Bay, Island of Upolu, Samoan Group, 1096 Hilo Bay, Hawaii, 1068 Hillsborough Bay, Prince Edward Island, Crapaud Road, Pr. Edward Island, 1097 Scatari Island and Menadou Passage, Cape Breton Island, 1013 Gulf of St. Lawrence, 1098 Amet Sound and Anchorages, Nova Scotia, 1099 Merigonish Harbor, Nova Scotia, 1100 Santa Rosalia Bay, W. Coast Lower California, 1113 Port Nelson, Rum Cay, Bahama Islands, 1107 Amherst Harbor

and Grand Entry Harbor, Magdalen Islands, 1115 Blanca and Falsa Bays, W. Coast Lower California.

From the Director of the U. S. Geological Survey, Washington, D. C.:

Mineral Resources of the United States for 1886, Washington, 1887; First and Second Annual Reports of the U. S. Geological Survey, Washington, 1880-1882.

From the Chief of Engineers, U. S. Army, Washington, D. C.:

Annual Report for 1886, Parts I, II, III, Washington, D. C., 1886; Annual Report for 1887, Parts I-IV, Washington, D. C., 1887.

From the Bureau of Education, Washington, D. C.:

Report of the Commissioner of Education, 1885-1886, Washington, 1887.

From the Bureau of Ethnology, Washington, D. C.:

Bibliography of the Eskimo Language, by J. C. Pilling, Washington, 1887; Bibliography of the Siouan Languages, by J. C. Pilling, Washington, 1887; The Use of Gold and Other Metals in Chiriqui, by William H. Holmes, Washington, 1887; Work of Mound Exploration of the Bureau, by Cyrus Thomas, Washington, 1887; Perforated Stones from California, by Henry W. Henshaw, Washington, 1887.

PART I.

— . — . — .

TRANSACTIONS
OF
THE SOCIETY FOR THE YEAR
1888.

TRANSACTIONS OF THE SOCIETY FOR 1888.

Annual meeting of the American Geographical Society, held at Chickering Hall, Tuesday, January 10, 1888, at 8 o'clock, P.M.

President Daly in the chair, until the delivery of the address, when his place was taken by Vice-President Egbert L. Viele.

On motion, duly seconded, it was voted to dispense with the reading of the minutes of the previous meeting.

The following gentlemen were elected Fellows:

Dr. A. Berghaus, John D. Crimmins, Frank S. Witherbee, Anson W. Hard, Henry Villard, John W. Burgess, Benjamin Stephens, Edward C. Donnelly, Alexander I. Cotheal, Sanders D. Bruce, Richard A. Elmer, G. H. Wynkoop, M.D., H. H. Bancroft, A. W. Colgate, Henry Marquand, Wm. Lane Booker, Albert Stickney Nicholas Fish, George Buckham, George Chase, Frederick T. West, Henry E. Russell, A. J. Drexel, S. G. Bogert, J. F. Alexander, Geo. F. Lespinasse, Prof. Thos. Davidson, Prof. H. H. Boyesen, Rev. D. Parker Morgan, Daniel W. Edgecomb, Hon. Benj. H. Bristow, John H. Parsons, Alexander T. Mason, John C. Henderson, Adolphe R. Coutan, H. A. V. Post, T. Harrison Garrett, Jas. T. Woodward, Byron W. Greene, C. Ridgely Goodwin, Jules A. Montant, Oliver L. Jones, Henry R. Hoyt, Edward Kelly, Leander H. Crall, Charles Albert Coutan.

The annual report of the Council was then presented, and read by Mr. William Remsen:

New York, January 10, 1888. Since the last annual report there have been held six regular meetings of the Society and nine stated and eight special meetings of the Council.

At the annual meeting of the Society on the 11th of January, 1887, the distinguished English Naturalist, Mr. Alfred Russel Wallace,

delivered a lecture on "Oceanic Islands: their Physical and Biological Relations."

On the 21st of February, the Hon. Clarence Pullen delivered a lecture on "New Mexico: Its Geography, Scenes and Peoples."

On the 15th of March, Mr. F. S. Dellenbaugh gave an account of his "Exploration of the Grand Cañon of the Colorado."

On the 15th of April, the Rev. Francis Brown delivered a lecture on "Recent Explorations in Egypt."

On the 20th of October, Dr. Franz Boas read a paper on "A Year with the Eskimos."

On the 23d of November, Dr. Eustace W. Fisher read a paper on "India."

On the 14th of December, Prof. F. A. Ober delivered an address on "The Ancient Cities of America and the Evidences of Early Civilization."

All these lectures were illustrated with stereopticon views.

During the year the volumes of the Journal for the years 1885 and 1886 were completed and distributed to the Fellows and to the various Societies and Institutions, at home and abroad, which exchange publications with the Society. The quarterly Bulletins have also been issued with regularity.

The additions to the Library and Map Room number 2299, viz: Books 724, Atlases 3, Maps and Charts 175, and Pamphlets (including Serials) 1897.

The annual report of the Treasurer, Mr. Walter R. T. Jones, shows a balance to the credit of the General Fund of \$823.18.

The Council feels itself justified by the facts in congratulating the Society upon the steadily increasing prosperity manifested in all its departments and upon the growing recognition in America and elsewhere of its long-sustained efforts in the cause of geography.

WILLIAM REMSEN,

Chairman of Council.

The Nominating Committee then presented the following report:
To the American Geographical Society:

The Nominating Committee, appointed to select officers to fill vacancies—under resolutions of the Society, passed at its meeting December 14, 1887—respectfully report the selection of the

ing nominees for election in accordance with Chapter V, Section 2, of the By-Laws:

For President—Charles P. Daly, LL.D., term to expire January, 1889.

For Vice-President—Gen. Geo. W. Cullum, U. S. Army, term to expire January, 1891.

Gen. Egbert L. Viele, term to expire January, 1889.

For Foreign Corresponding Secretary—Prof. Wm. Libbey, Jr., term to expire January, 1891.

For Treasurer—Walter R. T. Jones, term to expire January, 1889.

For Councillors—W. H. H. Moore, Isaac Bernheimer, Orlando B. Potter, D. O. Mills and Admiral C. H. Baldwin, U. S. Navy, terms to expire January, 1891.

Levi Holbrook, term to expire January, 1889.

Luther R. Marsh, term to expire January, 1890.

N. P. BAILEY, *Chairman*,
CLINTON ROOSEVELT,
CHARLES A. PEABODY,

Nominating Committee.

On motion of Judge C. A. Peabody, duly seconded, Mr. John A. Hadden was appointed to cast the vote of the Society for the nominees, and they were then declared duly elected.

The President, Ex-Chief-Justice Daly, then delivered an address on the "Recent Geographical Work of the World." The address was illustrated by large maps and by a number of stereopticon views.

At the close of the address a vote of thanks to the President, moved by Dr. Eustace W. Fisher, was duly seconded and unanimously passed.

The Society, on motion, adjourned.

Meeting of February 15, held at Chickering Hall.

President Daly in the chair.

The reading of the minutes of the last meeting was dispensed with.

The following candidates, recommended by the Council, were elected Fellows of the Society:

Herbert H. Knox, Wm. Smith Brown, Charles E. Malcolm, James H. Dunham, W. Gilman Thompson, M.D., Mrs. J. O. Moss, John Hyde, Daniel S. Riker, Alfred Corning Clark, Nelson Smith, Stephen Salisbury, Charles H. Ropes, Ten Eyck Wendell, Gustav E. Kissel, R. A. Lancaster, Henry Stanton, Inglis Stuart, Henry H. Cook, Wm. G. Ver Planck, Charles J. Canda, Henry E. Sprague, Alfred Roe, James D. Lynch.

The President then spoke of the loss sustained by the Society, and more peculiarly by himself, in the recent death of the Foreign Corresponding Secretary, James Carson Brevoort. The close association of many years had enabled President Daly to appreciate better than most men the kindly personal qualities and gifts as well as the rare scholarship of Mr. Brevoort. The post left vacant by his death had been filled by the election of Prof. Wm. Libbey, Jr., of Princeton College, where he held the chair of Physical Geography, formerly occupied by Arnold Guyot. The President then introduced Prof. Libbey, who read a lecture on "Moscow."

At the close of the lecture the Society, on motion, adjourned.

Meeting of March 29, held at Chickering Hall.

Vice-President GEO. W. CULLUM in the Chair.

The reading of the minutes of the previous meeting was, on motion, omitted.

The following gentlemen, recommended by the Council, were elected Fellows of the Society :

Gen. John J. Milhau, Richard J. Cross, Wm. W. Tompkins, Robert H. Worthington, Robert Treat Paine, James Lawson, Maturin Ballou, Dr. Wm. Starbuck Mayo, Edward S. Renwick, A. Cary Smith, Walton Ferguson, Wm. H. Starbuck, Oswald Jackson, Joseph Peabody, T. F. Oakes, James S. Coleman, Wm. A. Perry, Horace M. Taber, Chas. B. Wood, Wm. Rhineland, Horatio N. Twombly, John R. Tresidder, Theo. W. Myers, Frank H. Stott, Horatio Hathaway, W. Lloyd Jeffries, Theo. N. Vail, Wm. F. Coston, Charles Kellogg, James M. Lawton.

Gen. Egbert L. Viele then read the following Resolutions, which were unanimously adopted :

Resolved, That in the death of Joseph W. Drexel, a Fellow of this Society since 1876, and for the past five years a Member of its Council, the American Geographical Society has sustained a loss not easily repaired. His association with the aims and objects of the Society was a natural outcome of the intelligence and liberal culture as well as of the genuine and active benevolence and humanity, which made him a centre of good influences in the community ;

Resolved, That this Society extends its heartfelt sympathy to the afflicted family of the deceased, and that a copy of these Resolutions be transmitted to them by the Secretary.

Gen. Viele then announced the death of Henry E. Pierrepont, one of the earliest Members of the Society, and offered the following Resolutions, which were unanimously adopted :

Resolved, That in the death of Henry E. Pierrepont, one of the Founders of this Society, and for ten years, from 1852 to 1862, a Member of its Council, the American Geographical Society has met with an irreparable loss. When there was little but the sense of duty to bring the members together, Mr. Pierrepont, whatever might be the inclemency of the weather or the other seeming obstacles in the way, travelled from his distant home to take part in the work of the Society. The interest thus manifested in the early days he continued to show to the end of his unsullied life;

Resolved, That this Society sympathizes profoundly with the afflicted family of the deceased, and that a copy of these Resolutions be transmitted to them by the Secretary.

Vice-President Cullum then introduced the speaker of the evening, the Hon. Clarence Pullen, who delivered a lecture on the "City of Mexico."

At the close of the lecture, the Society, on motion, adjourned.

Meeting of April 25, held at Chickering Hall.

President DALY in the chair.

It was voted to dispense with the reading of the minutes of the last meeting.

The following candidates, recommended by the Council, were elected Fellows of the Society :

Harvey Kennedy, Edwin Mead, Mrs. Joseph W. Drexel, Samuel Mather, Edward Schell.

President DALY then introduced Mr. F. S. Dellenbaugh, who delivered a lecture on "Finistère: the Artist's Corner of Brittany."

At the close of the lecture the Society, on motion, adjourned.

Meeting of November 13, held at Chickering Hall.

President DALY in the chair.

It was, on motion, decided to omit the reading of the minutes of the last meeting.

The following candidates, recommended by the Council, were elected Fellows of the Society:

Rev. Hugh Smythe, Edmund Wetmore, Daniel Winslow, Edwin B. Sheldon, Townsend Smith, Geo. F. Johnson, Fred'k H. Chapin, Dr. C. M. Richter, William D. Phillips, Hon. Warren Higley, Chas. E. Hammond, Dr. S. B. Wolfe, Chas. S. Goodwin, Geo. W. McGill, Chas. M. Shipman, Dr. J. Whitney Barstow, James W. Hayward, Ed. F. C. Young, Cary W. Moore, Anson A. Gard.

The President then introduced the speaker, Gen. Jas. Harrison Wilson, who read a paper on "China and Its Progress."

At the close of the lecture the Society, on motion, adjourned.

Meeting of December 18, held at Chickering Hall.

President DALY in the chair.

On motion, it was resolved to dispense with the reading of the minutes of the previous meeting.

The following persons, who were recommended by the Council, were elected Fellows of the Society:

Capt. Henry Erben, U.S.N., Hon. Geo. F. Edmunds, Hon. Melbourne H. Ford, Hon. John E. Russell, Hon. Wm. C. P. Breckinridge, Wm. F. Chrystie, Joseph Grafton, E. Tiffany Dyer, John Baird, George E. Chisolm, Wm. F. Cochran, Oswald J. Martin, Wm. W. Skiddy, Charles A. Sherman, James McGee, Edward Uhl, W. Fitzhugh Whitehouse, Robert T. Reiley, Hon. Ira Davenport, Cortlandt Irving, Richard S. Dana, Thomas Ashwell, Lathrop R. Bacon, Hon. George West, Percival W. Clement, Fred'k P. Dimpfel, George B. Prescott, William M. Robinson, H. Van Rensselaer Kennedy, Hon. A. S. Paddock, John S. Schultze, Chas. T. Harbeck, C.,

Fayette Taylor, M.D., Alexander J. Bruen, S. M. Jarvis, Henry L. Bogert, F. G. Walsh, Francis S. Wynkoop, J. Lawrence McKeever, Robert Sturgis, M. H. Beers.

On motion of Dr. Eustace W. Fisher, duly seconded, the President was requested to appoint a Committee of Three to nominate Officers and Members of the Council to be elected at the Annual Meeting, to be held on the 15th of January, 1889.

The President then introduced Prof. Wm. H. Brewer, of Yale University, who read a lecture entitled, "A Contribution to the History of the Great Basin, west of the Rocky Mountains."

At the close of the lecture, the President announced the names of the Committee of Three, appointed in accordance with the request of the Society, as follows: Messrs. N. P. Bailey, Clinton Roosevelt and Chas. A. Peabody.

On motion, the Society adjourned.

PART II.

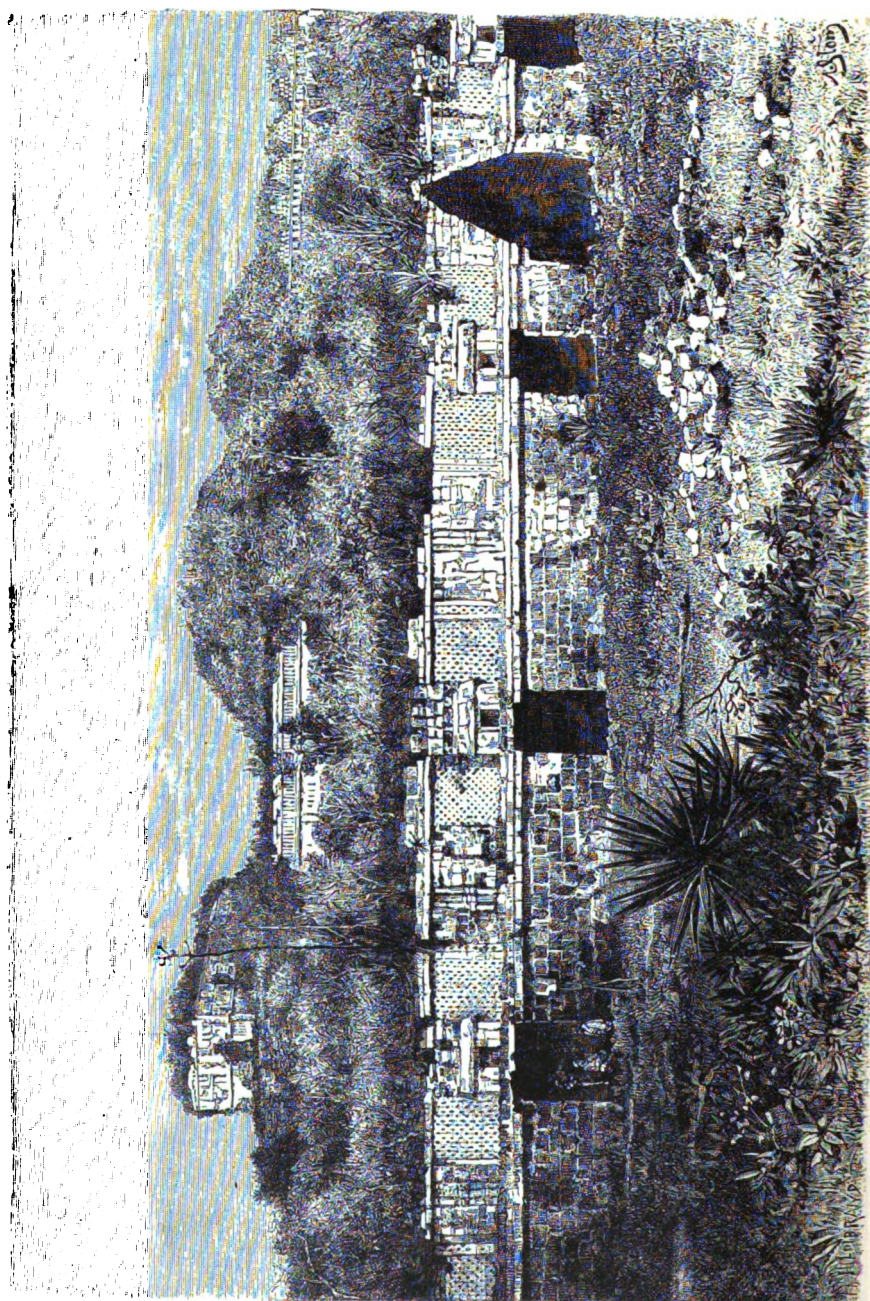
PAPERS READ

AND CONTRIBUTED TO

THE SOCIETY DURING 1888.

Note.—THE AUTHORS ALONE ARE RESPONSIBLE FOR THE CONTENTS OF
THEIR RESPECTIVE PAPERS.





RUINS OF UXMAL, YUCATAN.
From "Les Anciennes Villes du Nouveau Monde."

BULLETIN
OF THE
AMERICAN GEOGRAPHICAL SOCIETY

Vol. XX

1888

No. 1

ANNUAL ADDRESS

OF

CHAS. P. DALY, LL.D., PRESIDENT.

RECENT GEOGRAPHICAL WORK OF THE WORLD.

INTRODUCTION.

When I began, many years ago, to give, in an annual address, an account of the geographical work of the world, what was then done was so small, and the information to be obtained respecting it within a year was so limited, that I had to fill out my address with some other geographical subject.

In the course of time, however, the field of exploration became so great, and the amount of information to be obtained within a year so extensive, that I found it difficult to compress an adequate account of it within the narrow limits of such an address.

Minor details could be omitted when there was such geographical information to impart as was supplied by the Russian invasion of Eastern Asia, which made us acquainted with those long inaccessible cities of Bok-

hara and Samarcand, and those wild and conquering races that in the 12th and 14th centuries swept over Asia under Genghis Khan and Timour the Great, or where there was such a geographical event to describe as that wonderful descent of Stanley down the Congo, which revealed the course of that river and opened up Central Africa.

But such material is not to be found every year. There is a large amount of geographical work constantly going on ; and however wide-spread and important it may be, the details of it are so very much alike that a complete enumeration of them would make such an address exceedingly monotonous. For this reason I have, for a few years past, devoted my address to other subjects ; but in that interval so much has been done that is important and interesting, that I return with pleasure to a duty I discharged for so many years.

UNITED STATES.

I shall begin with an account of what has been done in our own country.

EXPLORATIONS IN ALASKA.

An expedition under Mr. W. H. Dall, so well known for his previous scientific researches in Alaska and the Aleutian Islands, established forty-two stations in Alaska for magnetic and astronomical observations, and settled the boundary line between the Russian and the American possessions, which line, as settled, passes through the Diomed Islands, in Behring Strait.

One of the remarkable discoveries was made in Kotzebue Sound. A mountain of ice from 600 to 800 feet

high, at a little distance inland, extended to Point Barrow. This great sheet of ice was covered with a non-conducting layer of moss and of vegetable mould, the clay of the period when the wild horse, the buffalo and the mammoth ranged over it; the bones of all of which animals were there found.

Lieut. Schwatka made a remarkable exploration of the Yukon River, in Alaska. He crossed with his party the Coast Range of Alaska to the head waters of the river, and there constructed a raft with which he boldly made the descent of this hitherto unknown stream for 1,500 miles—the longest voyage of this description ever made upon a raft. He surveyed the whole length of the river, which is more than 2,000 miles long, returning by sea to San Francisco.

A second expedition under the command of Schwatka was sent to Alaska in 1886 by the proprietors of the *New York Times*. The special object of this enterprise was the exploration of the Mt. St. Elias region. The results were the discovery of a river flowing from the base of the great mountain into Icy Bay. To this river was given the name of Jones, in honor of the patron of the expedition. It is claimed that this was not a discovery, and that the river was previously known. I shall not in this address enter into the dispute, but leave the river with the name that has been given to it. Several glaciers of great magnitude were also explored and named. An attempt was made to ascend the volcano; but, after reaching a height of 7,200 feet, the party found the obstacles insurmountable.

Another great river in Alaska was discovered and partly explored by Lieut. Stoney. It has been called

the Putnam, and empties into the Arctic Ocean, from which Lieut. Stoney entered it. For 300 miles from its mouth the stream was found to be broad and deep, and received many tributaries. After that distance Lieut. Stoney's further course was impeded by rapids. An attempt for seven days to haul their boats further up the river wore out his men, but the lieutenant, with two companions, made his way farther up, and found the river about the same as it was below the rapids.

Alaska appears to be as rich in glaciers as Switzerland. Mr. F. S. Wright has recently examined and described the most remarkable and the largest glacier yet discovered in the North-west. It is in Muir Inlet, from which it has been named. It is 250 feet high, and fills an amphitheatre more than 30 miles wide and of about the same breadth.

ARCTIC.

It will be sufficient, as I am in the region of the Arctic, simply to mention the Greely expedition and the rescue of its commander and survivors, for the Society gave General Greely and his companions a public reception, and is fully acquainted with the particulars of the expedition and its results.

The other Arctic expedition sent out at the same time under Lieut. Ray, to establish a Meteorological Station at Point Barrow, was more fortunate. A series of valuable observations was made; among others that there is no warm current running in this direction into the Arctic, and nothing to indicate the existence of an open Polar sea.

Geographical discoveries of importance were made by

Dr. Boas, a member of our society, in Baffin Land in 1883-1885. Dr. Boas rectified the line of the coast from Exeter Sound to the north, and the northern and eastern coasts of Cumberland Sound. He laid down correctly many of the islands, and devoted himself to a careful ethnological study of the Eskimos.

The suggestion made some years ago by Nordenskjöld that the interior of Greenland might be found upon investigation to be less desolate than was generally supposed, has not been confirmed by the results of recent explorations. Nordenskjöld himself in 1883 penetrated the country to a distance of 87 miles, and sent the Lapps of his party 143 miles farther, without finding any break in the great mass of snow and ice, which rose as the explorers advanced until it reached a height of 7000 feet.

Lieut. Peary, three years later, made a reconnoissance which confirmed Nordenskjöld's experience even more strongly, for he mounted 500 feet higher on the ice-cap than the Swedish explorer.

The effort to utilize Hudson Bay as a commercial highway to the north-west territory of the Dominion of Canada has not been successful. The result that has been found is that the passage through the 400 miles of Hudson Strait is never a safe one, even during the two or three months of the year when it is supposed to be open, and that a change in the wind may at any moment block it up with impenetrable ice.

COAST SURVEY.

A large amount of important geographical work has been done by the Coast Survey, which involves too

many details to be embodied in this address. A full account of it, for which I am indebted to the politeness of the superintendent, F. M. Thorn, Esq., will be published in connection with the Address in our Journal.

ANTIQUITY OF MAN IN AMERICA.

It has long been settled that North America, geologically, is the oldest of the continents. It has of late years been claimed by many American geologists that it was the first inhabited, or, at least, that the earliest remains of man have been found here. As all previous investigation by ethnologists, archæologists and historians has indicated that the earliest home of the human race was in the vicinity of the table-land of Central Asia, or in Asia Minor, this conclusion on the part of American geologists was not generally accepted, or, rather, to express it more correctly, was not thought worthy even of serious consideration. A very high authority, Mr. Alfred R. Wallace, who shares the honor of having announced contemporaneously with Darwin the discovery of the Darwinian theory of evolution, has carefully examined all the evidence relied upon by American geologists, and after a full and well-arranged statement of it, shows conclusively that man existed upon the American continent not only throughout the glacial period, when the northern part of America was covered by a great sheet of ice, but that he existed before it, in that period known to geologists as the Pliocene. It is now time, Mr. Wallace says, that the extreme scepticism that has existed on this subject should give way to an ever-increasing accumulation of facts. He especially dwells upon the fact that the Calaveras skull was

found in 1866, beneath four beds of lava, with a fifth bed of gravel on the surface, and upon the fragment of a human skull with the debris of a mastodon, that was taken out in 1857 from a shaft in Table Mountain in California, 180 feet below the surface; these fragments lying beneath a bed 3 feet thick of cement, together with fossil leaves and branches, over which were 70 feet of clay and gravel.

We have therefore the curious fact that what has been called The New World (America) is, geologically, the oldest, and was, as far as existing evidence shows, the earliest abode of the human race.

ANCIENT NORTH AMERICAN CITIES.

Mr. F. Cushing, who two years ago gave the Society an interesting account of Zuñi Land and its ruined cities and Pueblos, is at present at the head of the Hemenway expedition, which for several months has been engaged in excavating the ruins of an ancient city in Arizona, which is 3 miles long and 2 miles wide. He had previously found three other cities which constitute a part of a chain of cities that once covered what is now a desert. There are nineteen of these ruined cities in Salt River Valley alone, one of the smallest of which must have had a population of at least 10,000 persons. The people who lived in these cities, it is said, preceded the Aztecs, and had, to judge from the human remains and relics that have been found in the houses, a civilization which the explorers think as old or even older than the Egyptian Pyramids. Mr. Cushing says that the dwellers in these plains were Toltecs, an agricultural people, who had reached a high state of civilization

many centuries before the Aztecs appeared ; that they were of Asiatic origin, but not a Mongolian race like the Indians of the Pacific coast, who were, he thinks, a later emigration. The soil and climate seem to have been the same as now, but a vast system of irrigation was required to make the land productive, for which ditches were dug. There were traced and laid out on the maps of the expedition, 300 miles of these ditches.

The population of one of the plains—that of Tempe, which had been highly cultivated, is estimated to have been 250,000. But this is only one place ; similar indications of these ruined cities were found over adjoining mountains and through three successive valleys.

The chief food of the people was corn, which was very abundant. Their animal food was of the deer, the antelope and the rabbit ; the remains of no other animal having been found. They had neither horses nor sheep. In the mountains the buildings were of stone instead of *adobe*, and the fields were divided by stone walls. Mr. Cushing thought these ruins extended as far as Utah and Southern Colorado, and as far east as the Rio Grande, and into Central Mexico. In the large city—"De los Muertos"—or the city of the dead, twenty-two large blocks of buildings have been explored, and three railroad car loads of relics taken from them have been sent to Boston. One of the buildings measured 400 by 375 feet. The buildings are two stories high, the entrance in some being through door-ways and in others through the roof. The roofs were of concrete, and most of them have fallen outward, indicating destruction by earthquakes ; and that the cities were suddenly overthrown by a convulsion of this nature, appears by the

finding of skeletons under fallen roofs and timbers, in a position to indicate a sudden and violent death, and the large number of skeletons found shows that the destruction was sudden and wide-spread. The people that remained after these fields and cities were destroyed were made war upon by the wild tribes of the hills and forests. They were driven south into Mexico and beyond it, until every vestige, except these ruins of this remarkable and widely-spread pre-historic civilization passed away forever.

CENTRAL AMERICA.

CHARNAY'S EXPLORATION OF ANCIENT CITIES IN MEXICO, GUATEMALA AND YUCATAN.

M. Désiré Charnay, whose name is well known to the Society, resumed his exploration of the ruins of the ancient cities scattered through Mexico, Guatemala and Yucatan, and has embodied the result of his labors in a sumptuous volume, the interest of which is heightened by the manner in which the journey of the traveller is interwoven with the exploration and learned expositions of the archæologist; a book distinguished by the newness of the facts, the comprehensive grasp of the subject, and the charming style in which the narrative is written.

He describes a civilization, he says, long extinct, though not very old, and unknown, or rather misunderstood. He traces its origin on the high plateaux of Mexico to its highest development as it moved southward in the different parts of Central America; a civilization beginning with the Nahuas, a people of several tribes, of

which the Toltecs was the most endowed, a race intermingled with many foreign elements, people of the Antilles, Polynesians, Japanese, Chinese, Cochin Chinese, and Malays. He fixes this civilization as existing from the 7th to the 14th century. He thinks that the people from whom it emanated entered America by Behring Strait, after traversing Tartary, crossing the ocean on square rafts and large flat boats, called in the manuscripts sea houses, and then moving southward, founding their first city not very far from the present City of Mexico, and their second and more famous city near the north of the Gulf of California. He thinks that he has been able to fix the date of certain epochs and to establish some historical truths. He pays a high compliment to our countryman, Stephens, who preceded him in the exploration of Yucatan.

He believes that this civilization was mainly Toltec; that the Toltecs were the inventors of the hieroglyphics or written language by which they preserved their history on skins of animals, or on paper made of the maguey or palm tree, and were the inventors of many arts they are known to have possessed; that they were the great builders; and he finds an extraordinary resemblance between the sculptures at Angkor, in Cambodia, and the temple of Castillo, at Chichen-Itza, in Yucatan. The account he gives us of this people and of their great city, Tula, is most interesting; their pure manners, high morals, poetical feeling, and religious conception of a future life. He tells us that their principal god, Tlaloc, the god of rain and abundance, was a beneficent being, and worshipped by offerings of flowers and fruit; and that it was their successors who changed his worship into a

bloody sacrifice, instead of the gentle and poetical rites of this highly civilized and interesting people.

SOUTH AMERICA.

The French explorer, Dr. Crevaux, after geographical labor in the affluents of the Amazon and in Guiana, explored the Guaviare, a branch of the Orinoco, and descended the Orinoco to its mouth, where he passed some time studying the Indian tribes. In 1882 he went on an expedition to the Gran Chaco, where he and his party were massacred, near the mouth of the Pilcomayo, by the Toba Indians. M. Thouar organized an expedition to relieve the survivors, if there were any. He entered the Gran Chaco in the N. of the Argentine Republic, in the autumn of 1883, and reaching the spot where the massacre occurred, he found that the whole party had perished, and his own company was only saved from destruction by incessant vigilance. After several months of great hardship he reached Asuncion by way of the Pilcomayo River.

M. Wiener, the French Vice-Consul in Ecuador, passed through the Napo River to the Amazon, and so reached Brazil.

In 1885 M. Thouar was sent to study the Pilcomayo River, particularly with a view to its fitness as a waterway for commerce, and his report is that the river, with little trouble, could be made navigable.

The Gran Chaco he declares to be a healthy and fertile country, naturally divided into three zones: (1) that of the lowlands, near the streams; (2) that of a higher level, subject to overflow in great freshets, and (3) back of these the elevated plains, which are never submerged

by floods. The Pilcomayo banks are higher than the country behind them.

A most notable exploration in Brazil was that of the Xingú River by the German explorers Von Steinen and Claus. They started from Cuyabá, the chief town of Matto Grosso, a province more than four times as large as California, and descended the river to the estuary of the Amazon. Their observations established beyond a doubt that the whole of Brazil, south of the Amazon Valley, was once a great table-land, which has been undergoing denudation by water. The Matto Grosso region is of sandstone formation, with a mean elevation above the sea of 1475 feet. The chief commercial product of the Xingú is india-rubber.

The sources of the Orinoco, it is reported, have been reached within the past year by M. Chaffanjon. Some doubt still remains as to the fact, but it is certain that the mystery which has covered the origin of this mighty river will soon be dispelled.

The exploration of the southern end of the South American continent has been mainly the work of the Argentine Government. Mr. Moreno, under commission from his government, ascended the Rio Negro in Patagonia, and penetrated as far as the eastern slope of the Andes and the great lake, Nahuel-Huapi, which lies in the midst of mountains clad with birch and pine trees and abounding in glaciers. A later expedition established the fact that the waters of Lake Pirihuacá, which pass to the Pacific through the river Calle-Calle, have also an outlet to the Atlantic through the river Huahun.

Lieut.-Col. Fontana, Governor of the Chubut River territory, explored, in 1885 and 1886, the plains and the

slopes of the Andes. The aspect of the open country was desolate, but all the valleys were found to be covered with a rich vegetation. There were innumerable lakes, and streams of clear water, which were always in sight.

The French scientific expedition sent to Tierra del Fuego, in 1882, to observe the passage of Venus, made a number of hydrographical surveys and soundings in the archipelago.

A very interesting and valuable report upon Tierra del Fuego has been sent this year to the United States Government, by our Consul at Buenos Ayres, Mr. E. L. Baker, which shows that the general impression hitherto received respecting this region is unfounded; that it is a far better country than it has been represented, and is, especially the Argentine portion of it, largely capable of colonization and settlement. No country, says Mr. Baker, has ever been so persistently maligned and misrepresented, because those who visited its coast never penetrated into the interior, but drew their conclusions from what they saw or imagined they saw from their ships. Mr. Ramon Lista, who has travelled extensively in South America, and explored nearly all of Patagonia, says in respect to this part of Tierra del Fuego: "I have travelled from one extremity of the country to the other, and am scarcely able to credit what my astonished eyes have seen." Instead of the cold, bleak, and inhospitable country that it has been represented, he saw flowery plains of grasses capable of sustaining thousands of cattle and sheep, leagues upon leagues of rich valleys, accessible mountains, without snow, magnificent fruits, plants that in Buenos Ayres can be

grown only in a green-house, and nowhere had he received such profound emotions in the contemplation of natural scenery as in Tierra del Fuego. This statement, with what he says of the mildness of the climate, of its grassy valleys, rich pastures and virgin prairies, is indeed, geographically, a revelation.

AFRICA.

For the past few years Africa has been the part of the globe in which geographical exploration has been the most extensive and the most important. Beginning with the northern coast, a material fact to notice is the extension, in 1882, of a French protectorate over Tunis, which is, in fact, substantially taking possession of the country. Lieut.-Colonel Playfair, the British Consul General, who, in 1876, was the first person to pass through the Khoomir country, which was then a blank upon the maps, in 1884, eight years afterwards, visited the same region, passing over admirable carriage-roads, which were the work of the French. There is now a railway from Suk-Ahras, on the Algerian frontier, to Tunis, in which city good roads have been made and a new French city, alongside of the old one, is now springing up. Land is rapidly purchased for cultivation under the Torrens Act, by which it is said real property is as easily transferred as a bank share. The Roman remains throughout Tunis are being explored more effectually than has heretofore been done respecting remains of Roman civilization in Northern Africa.

In the years 1883 and 1884 Mr. de Foucaud made an extensive journey in Northern Africa. He traversed the Atlas range, passing along its whole length to the

Algerian frontier, a distance of 435 miles. Although the Atlas Mountains have been long known, they have never been fully explored, for he found the range flanked by parallel ranges that are not on any map. There is a chain 186 miles long, which lies north of the Atlas range, and south of it are the little Atlas and the Djebel-Bani ranges.

The Sahara Desert has recently been more accurately ascertained by a number of explorers. The mean elevation of this region is now known to be 1600 to 1650 feet above the level of the sea. A fifth part of it only has been found to be sandy, and chains of mountains, unknown before, have been discovered that are from 6000 to 8000 feet high. In some parts of it there is a rainy season, when the thermometer ranges from 122 Fah. to 19 degrees, and where the loftiest mountains are capped with ice for several months in the year, whilst in other portions of the Sahara rain falls only once in about 20 years. The whole area of this great region is now ascertained to be 3,700,000 square miles, which is about the size of the whole of Europe. Its entire population is now estimated at about 3,000,000, and there are towns containing from 5000 to 10,000 inhabitants, which is a much more favorable condition than has been supposed, as this whole space has hitherto been marked upon the maps as one vast desert.

The region between the rivers Senegal and the Niger for nearly 1000 miles in length has been surveyed, and the water-shed of the Senegal has been found to be near Bamaku, on the Niger, and all the rivers descending from it flow into the Senegal.

In 1887 the French commander in that region, Cap-

tain Gallieni, sent up the river Senegal a steamboat in parts, which was carried across the water-shed from the Senegal to Bamaku upon the Niger, where the boat was put together, and from there she went under the command of Lieut. Caron, up the Niger north to Kábara, which is the port of Timbuctoo. The unexpected appearance of this boat, moving without oars or sails, for a steamboat had never been there before, as the rapids and other obstructions on the Niger prevent the passage of vessels from the gulf, filled the people of Timbuctoo with amazement, none of whom had ever seen a steamboat, and few of them had ever heard of one.

This city was last visited in an overland journey across Morocco by the Austrian traveller, Dr. Lenz. He found it somewhat larger than it had been described by Barth, the German traveller, in 1854, but even now it is not remarkable in population, as it has but about 20,000 inhabitants. It will be remembered that the wealthy Dutch lady, Miss Tinne, who became distinguished as a geographical explorer in Borneo and in Africa, was killed near this city. Dr. Lenz saw one of the party by whom she was murdered. He was also told that some of the effects of Col. Laing, who had been killed in this part of Africa more than 50 years ago, were still preserved. Col. Gallieni has reported that the country of the upper Gambia and its affluents has now been surveyed, and that, by a treaty made with the Almamy Samory, a French protectorate has been extended along the right bank of the Niger from Segu to the boundaries of Liberia and Sierra Leone.

The sources of the Niger were discovered in 1879 by the French explorers Zweifel and Moustier, in the hills

near Nelia, about 200 miles east of Freetown, the capital of Sierra Leone. The course of this great river is north-north-east, to Timbuctoo, when it turns to the east, then to the south, south-east, and finally south to its mouth in the Gulf of Guinea. The country enclosed between the river and the gulf is almost wholly unknown.

Germany, as will more fully appear hereafter, has become a great colonizing power in Africa. She has annexed in part what is known as the Cameroon region, on the west coast; and through her possessions on the Gulf of Guinea she is now reaching inward for the trade of the Soudan and the country about Lake Tchad.

The Cameroon region has considerable elevation at a short distance from the sea. The chain known as the Cameroon Mountains reaches to an altitude of more than 10,000 feet. At the height of 3,000 feet the palm tree ceases and is succeeded by tree ferns, until at 8,000 feet the wood belt ceases altogether. At the height of 12,000 feet on the Cameroon Peak, Mr. Grenfell, the English missionary, found that the thermometer marked in the month of March 47° Fah. The country is in most places exceedingly fertile and is capable of great development, to which those native organizations known as Secret Societies are strongly opposed; and as the influence of these Societies over the chiefs and kings is very great, they may interpose serious obstacles to the development of this part of Africa.

It is very evident that the creation of the Congo Free State, which dates only from 1885, and embraces a great portion of the valley of that river, has been an

important factor in the civilization of Africa, as it has undoubtedly stimulated the Portuguese and other powers having African territory to greater exertions. It has roused the colonizing instinct in nations hitherto indifferent to efforts of that kind. Germany has already withdrawn the large fund which was annually devoted to geographical exploration, that it might be applied exclusively towards the successful colonization of the portions of Africa of which she has taken possession.

What has been done in the region of the Congo in three years is wonderful. The river has been carefully traced from Lake Tanganyika, in the east, and along its northern curve to the Equator, and thence south-west-erly, until it discharges itself into the Atlantic. The greater part of the valley of this great river, with its subordinate valleys of the Ubangi on the north and the Kassai on the south, is full of streams and capable of extensive cultivation. Along the river many stations have been founded, which are likely to grow into extensive centres of civilization, and the activity of explorers, English, French, German, Swedish, and Austrian, has been unremitting.

An English engineer, who has furnished a very valuable paper in a recent number of *Blackwood's Magazine*, confirms the statement of Stanley that the country in the interior is far healthier than the coast, and that with ordinary care it is not more injurious than the climate of the island of Jamaica or of Singapore.

The climate, he says, is blamed for fevers and other diseases which are brought on by the follies and carelessness of the new-comers, and that the fevers of the country are not dangerous if treated in time, and can

generally be avoided by care. When the country, he says, is more opened up, and Europeans are able to bring out home comforts, they will be able to live there with as much ease and safety as they now do in India.

The effort of the King of the Belgians in maintaining the organization and the keeping up of a central route as a means of communication from the west to the east coast, has added greatly to our information of the extensive region through which the Congo flows. Steamers now run on the upper Congo from Stanley Pool to Yellala Falls, where the lower Congo begins. For 230 miles this great river is unavailable for the purposes of navigation. Over this long distance merchandise has to be carried by porters, marching in Indian file through a pathway about 9 inches wide, bounded on either side by a dense jungle of cane-like grass, which is never lower than the shoulder. Over this unavailable space for navigation a railway is now contemplated, and when this is accomplished a great change in the whole of Central Africa will follow.

Lieut. Wissman has made a second journey across Africa. He started in October, 1886, from Luluaburg, a station of the Congo Association, in the empire of the Muata Yambo. He had wished to explore the country to the north-east of the Lubi River, but he found the state of things so much changed since his former visit, four years ago, that he was unable to carry out his project. Formerly the cowrie was the principal object of barter, but now guns and ammunition were what was demanded. The slave trade was flourishing on the Lukassi River. He was attacked and several of his party were killed by poisoned arrows. The land of the

industrious Beneki, whom he visited on his first journey. he found entirely devastated. He crossed a country depopulated by war and by small-pox. His own followers were stricken by the disease, and the party suffered for want of food. When he reached Nyangwe he found the Arabs in great excitement over the capture of Stanley Falls Station. From there he sent back the Bassilonge who were with him, and continued on his route to Zanzibar, whence he returned to Europe.

The results of this expedition are not so important as it was hoped they would be. What was wanted was a more thorough knowledge of the hydrography of Central Africa, to which the expedition, for the causes above stated, can have contributed but little.

The Kalahari desert of Southern Africa is by no means an uninhabited waste. The estimate of its size varies from an area equal to that of Texas to one of twice that extent. The Orange River forms its southern boundary, and it is partly watered by eight or ten rivers on the east, and by Lake Ngami. The small streams which feed these rivers, overflowing in certain places, create marshes; but the land is generally elevated, the central water-shed being over 4000 feet in height at a point where Mr. A. A. Anderson, who has studied the desert for many years, ceased his explorations.

Coming to the east coast of Africa, the first fact to be noticed is the signal success on the part of the Portuguese in Mozambique, a colony that for more than forty years has been harassed by the depredations of a chief named Bonga, who controlled the Zambesi between Tete and the sea. The stronghold of this robber chief and

all of his fortified villages were captured recently and his mastery over a river so important as the Zambesi has now wholly ceased.

The Congo Free State has made no effort to extend its authority between Lake Tanganyika and the Indian Ocean, for Germany has practically annexed, under the name of a protectorate, the whole of the territory, of undefined extent, but which is estimated at 150,000 square miles, lying between Lake Tanganyika and the main land of the Sultanate of Zanzibar, which embraces Dar-es-Salam, one of the finest harbors on the Indian Ocean. Stations have been already established on the roads leading inland to Massai Land and around Mount Kilimanjaro, the highest mountain in Africa. This great mountain, which lies about three degrees below the equator, in the range of mountains that stretch from the Victoria Nyanza to the ocean, is 20,000 feet in height. It was first discovered by the missionary, Rebman, nearly forty years ago. It has since been visited by many travellers who have attempted unsuccessfully to climb it; but Dr. Meyer, it appears from recent information, succeeded in attaining to within 200 feet of the top of Kibo, the higher of the two peaks.

Like many of the Mexican and South American mountains, Kilimanjaro presents every variety of climate and nearly every form of vegetation, from the plants of the Torrid Zone to those of the Arctic.

Farther to the south and west the new German territory is bounded by Lakes Tanganyika and Nyassa, and in this way the colony will have an outlet into the great basins of the Nile, the Congo and the Zambesi. The whole region is remarkably fertile, so far as known. The

climate is favorable to the white man, and it is a subject of general congratulation that the development of this large and important region of Africa has passed into the hands of the Germans.

Immediately north of this German Protectorate lies a somewhat smaller protectorate, which is recognized as English, and which has heretofore been as little known as Kilimanjaro.

The line claimed by the English runs north-west to the Victoria Nyanza, and across the mountain range. Almost under the equator stands Kenya, the second in height of the African peaks. The mountain, as seen and described by Mr. Joseph Thompson, appears to be more impressive even than Kilimanjaro. Mr. Thompson says Kenya rises as a great volcanic cone, nearly 30 miles in diameter at its base, from an elevated, thorn-clad plain, 5700 feet above the sea, to an altitude of 15,000 feet. He says the angle of the mountain is very low with a slope comparatively unbroken by ridge or glen. From that height of 15,000 feet the mountain suddenly springs up 3000 feet in a sugar-loaf peak, the resemblance to a sugar-loaf being made the more striking by the glittering facets of snow which characterize this peak.

Just north of the English Protectorate lies Vitu, a German colony, at the lower limit of the vast region known as Somali Land, a land which stretches north-east to Cape Guardafui, and thence west to the Gulf of Tanjarah. The limits of the interior of Somali Land are somewhat undefined, but it would seem to be as large as France. It is inhabited by the Somali and Galla races, which are divided into many tribes, who are so war-

like that they are not often at peace among themselves, and so aggressive to strangers as to make the exploration of Somali Land exceedingly dangerous. The Gallas, living more to the west, have crossed into Abyssinia and established themselves there. Not only are the tribes hostile to strangers, but the country itself is difficult of access. A journey from Zeila, on the Gulf of Aden, to the Harar, a distance of 185 miles, gives a very good idea of the general nature of this land. The first 50 miles is over a sandy plain, without water, after which the road is up the beds of rivers, across mountains and through deep ravines. Here are vast tracts of stony plains, supposed to be impassable, and from the warlike character of the savages who inhabit this region, and the nature of the country itself, it may be a long time before we shall have anything more than a fragmentary knowledge of this great peninsula.

The exploration of the interior has been actively undertaken by Italian travellers, of whose explorations and journeys I have given an account in previous addresses. The efforts of these Italian explorers may be briefly summed up in the short statement that they have displayed the highest heroism, with the most devoted perseverance, and have added many to the long list of those who have succumbed to disease or lost their lives by violence, in the effort to penetrate and civilize this vast continent.

In Egypt, now under British control, the labors of travel and exploration have been confined to the better known portions of the country, and have been necessarily archæological in their character.

During the past year, however, Prof. Ascherson made

some investigations in the Delta of the Nile, east of the Rosetta branch. He visited the coast lake, Burlus, which he calls Brullus. It abounds in salt-water fish, and the district contains 100 settlements and about 15,000 people. The town Burlus, marked on the maps, does not exist, and the cartography of the district was found to be in need of correction.

Prof. Ascherson then proceeded to the Suez Canal and followed the Syrian caravan route to El-Arish. The country east of the canal is rich in vegetation, and the rain-fall in winter is not inconsiderable. There were heavy showers on April 30th and May 1st, which is noticeable, as Egypt is supposed to be rainless. Fair hair and blue eyes were not uncommon among the inhabitants, who were a mixture of Arabs, Syrians and Turks.

The Raïan basin of the Nile, explored and surveyed by Cope Whitehouse, is found to be adapted to the formation of a storage reservoir for the waters of the Nile; and the English engineers strongly urge the undertaking of an enterprise for the purpose.

Both Emin Pasha's geographical work in the Egyptian provinces, and the Congo Free State, are but the realization of Gordon's idea that the civilization of Africa could only be worked out by attacking and suppressing the slave trade from within as well as from without.

The possession of the sea-coast by the European Powers will cut off the foreign market for slaves, and it is hoped put an end to this traffic, which is now desolating the healthy regions of the interior, for on its suppression depends the future civilization of Central Africa.

EARTHQUAKES AND VOLCANIC ERUPTIONS.

The changes made upon the earth's surface by the effects of earthquakes and volcanoes may be embraced in this enquiry, as they are a part of the geographical work of nature. As the disturbance of the earth's surface by earthquake-shocks and the breaking forth of subterranean forces in volcanoes have, during the period covered by this address, been so extensive and so widespread, a very brief enumeration of them may be offered to show how much takes place in this way in a very limited space of time.

In 1880 there were thirty earthquakes, and in 1881, twenty, the most serious of which was at Casamicciola, upon the island of Ischia, in the Bay of Naples, which destroyed the upper end of the town: by which one hundred persons were killed. This is supposed to have been caused by the sinking of the soil.

In 1882 there were fourteen earthquakes in Europe, Asia and America, and seventy-four in Japan, where Professor Milne says there is an earthquake every day in the year. There was a severe one that year at Fayal, in the Azore Islands, and a severe one at Panama. In 1883 many shocks were felt in Andalusia and Murcia, in Spain, and along the Mediterranean to the Balkan region. In 1884 there was one in England, with great damage to buildings and some loss of life. Thirty-four slight ones were reported that year from various places, thirty of which were in Japan. Upon Christmas night of that year violent shocks were felt in Austria, in Italy, and especially in Southern Spain. At Arenas del Rey 500 persons were killed or injured, and others in many towns along the coast. At Alhama, the upper town,

which was on a hill, was thrown upon the lower town, and 1500 houses were crushed. The area chiefly affected was between Cadiz and Cape Gata, and from Malaga to the Carpetana chain. At Güevejar a fissure opened in the earth which split an olive tree in the centre from root to branches, leaving half of the tree hanging on one side of the cleft and half on the other. A remarkable earthquake in 1886 was the one in Charleston, South Carolina, the shock of which was felt from the Gulf of Mexico to the great lakes, and from the Atlantic to the Mississippi River. The natural phenomena connected with the Charleston earthquake were curious fissures opened, often of great length, sulphurous fumes emitted, sand, red and white, thrown up, and brackish, tepid water spouted out.

In January, of last year, an unusually violent earthquake near Tokio, in Japan, was felt over 32,000 square miles.

One of the most remarkable volcanic eruptions known in the history of the world occurred in 1883, in the volcanic island of Krakatau, in the Strait of Sunda, which separates the island of Sumatra from Java. The volcano was supposed to be extinct, but on the 20th of May an eruption began, which lasted several days. A white column of vapor, enclosing dark clouds, rose to the great height of 36,000 feet. The eruption continued from the 22d to the 23d of May, and from the 25th to the 28th of August following; the latter being the most severe. The disturbance was accompanied by great tidal waves, which, at Merak, rose to a height of 90 feet, and swept the whole coast up to the hills. In Merak only one person was left alive. There were

three tidal waves, the last carrying off all that was left by the two preceding. The devastation was terrible, both on the Sumatra and the Java sides of the strait. Whole villages were destroyed ; explosion followed explosion, with a rain of ashes continually. The distance at which the noise of the eruption was heard surpasses anything previously known. The report was heard in every island of the Archipelago, including the Philippines. Taking the volcano as a centre, the sounds were propagated in a circle, having a diameter of 4142 miles, and the area enclosed within this circle was equal to one-fifteenth of the earth's surface. The very fine ashes carried up into the air changed the appearance of the sun as seen at Japan, in places on the Mediterranean and on the Pacific Ocean. The ocean wave extended 6685 nautical miles, and what is most remarkable, there was not the least mark of upheaval discovered either at the bottom of the sea or on the coast.

ASIA.

The Russian scientist, Konschin, made a journey east of the Caspian and north-east of Turkistan, embracing the Kara Koom desert and the Attak oasis, a region of vast sands and salt deserts. The Kara Koom desert, he thought, was a part of the old Aral basin in which he saw evidence of great geological change. He found that the Kara Koom desert retained traces of marine fauna. The eastern part of it, which consists of dried-up lakes, is the oldest, and has a line of hills that mark the ancient shores of the Caspian Sea. The conversion of the desert into sand, he thought, was owing to upheaval and the polar winds.

Bonvalot and Capus, the French travellers, passed two years in exploring the region of the river Oxus. They descended the Oxus and found ruins of towns dating back to the time when the river flowed into the Caspian Sea.

OXUS.

A bridge over this river near Charjui, more than two miles in length, has recently been constructed, and two Russian steamers have been launched upon the historic river and now run regularly upon it. The erection of this bridge over the Oxus and the completion of the railroad to Samarcand will no doubt be followed on the part of the Russians by the annexation of Bokhara, and Russian dominion will thus be secured from the base of the Caspian to this important part of Turkistan.

The Russian traveller, Sevastof, examined the famous region of the Pamir. He says it is not a table-land, and that it has no steppes up to 12,000 feet. The valleys are about 13 miles wide, and the mountains are 7000 feet above the valleys. Three of the mountains rise to a height of 25,000 feet.

Prejevalsky, the Russian explorer, whose previous geographical labors in this part of Asia I have frequently mentioned, crossed the Gobi desert to Alachan, in Mongolia, and so into Northern Thibet, where he found men working in gold mines, and he thought this part of Thibet richer in gold than California. He reached the Koko Nor lake, which is 15,700 feet above the level of the sea, and is 170 miles in circumference. He found it frozen at the end of April. West of the lake was a great salt marsh, 500 miles long and 70 miles wide, and on the plateau upheld by the great mountain,

which was over 17,000 feet high, he found the sources of the celebrated Chinese rivers, the Hoang-Ho and the Yang-tze-Kiang. He reached the source of the Hoang-Ho, which he found to be 13,600 feet high, and the water-shed between the two rivers was 1000 feet high. The climate was terrible at the end of May. The region is wild and forbidding, so that the nomadic tribes will not stay, and yet it abounds in wild animals.

The well-known Russian traveller, Potanin, in 1883 and 1884, with Skassy and Berezovski, accompanied by Madame Potanin, who rendered valuable aid, made a journey of exploration in China and Mongolia, starting from Peking. To give an account of this journey would require the constant mention of Chinese names which would not indicate the journey, without a much fuller map than it is possible to display upon this platform. It must suffice, therefore, to say that it was over great plains and high plateaux, following up and crossing labyrinths of steep mountains cut in nearly every direction by narrow valleys, which are the sources of great rivers. On the plain of Ordos, in Mongolia, which is bounded on three sides by the bending of the Hoang-Ho, or Yellow River, and on the fourth by the mountains that divide the plain from China proper, they saw a felt tent, in which, it was said, were kept the bones of Genghis Khan, who died here. Legends respecting him abounded everywhere about. It was believed that his body was enclosed in a silver coffin with an outer case of wood, under a canopy of silk. Members of his family lie buried around him for a distance of 3 miles. It is believed that every evening a sheep and a horse are offered up to the spirit of the great Asiatic conqueror,

or, as he is called, "The Supreme Sovereign." The people declare that the voices of the Chinese he had slain are heard around at night, with other sounds and sights, as Milton expresses it,

" — airy shapes that syllable men's names
In sands and wastes and desert wildernesses."

It is a tradition that the long sand dunes which exist there were thrown up as ramparts by Genghis to turn the course of the Yellow River. Wild as the region was, they found the remains of great cities, one of which, 20 miles south of the Hoang-Ho, had walls that measured nearly 5 miles on a side. At Lan Chu they found the country one vast garden. Here they separated, and Potanin went up the Hoang-Ho to its sources.

A pundit, A——k, of the Indian Survey, made a four years' journey through Great Thibet to the north and east over a vast region almost wholly unknown. With a rosary to count his paces, a prayer-book, and speaking Thibetan, he crossed the Himalayas, entering Thibet, and found his way to Lassa, where he was detained a year; but where, however, he was not idle, for he made a survey of this celebrated but little-known city, the Rome of Thibet, which is crowded with temples and religious edifices.

After this he went with a caravan north-easterly to Mongolia, crossing the great plain of Thibet, called Chang Tong, or the Northern Plain. Over this plain he passed a cultivated country, with fixed habitations; then a pastoral land of 180 miles of wandering encampments, where he counted over 7000 tents. The remaining 240 miles of Chang Tong he found uninhabited, and

abandoned to wild animals. The highest pass crossed was the Donga range, 16,400 feet, which is the water parting between the Yang-tze-Kiang and the Mekong of Cambodia. He descended to a level of 9000 feet, where he found a comparatively warm region, with abundant forests and cultivation, thus reaching the border-land between Thibet and China. He passed through Lithang, one of the highest cities of the world, at an altitude of over 13,000 feet, (about the height of Potosi, in Bolivia, which is 13,649,) and which, though at the very extremity of respirable atmosphere, had at one time a population of 150,000. He found that the Sangpo River merges into the Bramapootra, as Colonel Yule and other geographers have maintained, and in November, 1882, he completed the arduous journey of 2,800 miles through a nearly unknown country. He succeeded in keeping up an unbroken route survey, with magnetic bearings, bringing back with him all his field-books, after exploring regions which Englishmen, Russians and Hungarians have heretofore attempted in vain.

THE HOANG-HO.

A remarkable event occurred during the present year in North-eastern China. The Hoang-Ho, or Yellow River, is one of the great rivers of the world, and also one of the most devious, running over its long course of 2700 miles in every direction, north, south, east, and west. It is also the most turbulent and impetuous of rivers, sometimes changing its bed and finding a new mouth far from the former one, and at others expanding into vast and destructive floods. Its source has recently been accurately ascertained, as I have said, by Mr. Pota-

nin, who found that it rises in the Amdo plateau of North-eastern Thibet. Previous to 1853 the river descended from the north and ran almost directly south for about 500 miles, where it made a bend, and entering the great plain of Northern China ran almost due east for about 650 miles to the Yellow Sea, where it formed a large mouth or estuary. In 1853, in the mountainous region where the river takes its rise, at an elevation of nearly 12,000 feet, the accumulation of snow was so great, and the melting of it so rapid, as to largely swell the volume of water in the river, which, augmented by the autumnal rains, became so powerful that beyond the great bend, near Kai-fung-Fu, where the country is low and flat, the river burst its northern bank, and, passing through the opening thus made, found its way in a north-easterly direction to the Gulf of Pechili, 500 miles from its former mouth.

This catastrophe was attended by wide-spread destruction, for the country through which the river rushed in its new course was one of the most fertile and thickly populated in China. The destruction of property and of human life was very great ; and now, after 35 years, and after the country thus devastated had recovered from the disaster that befell it, the accursed river, as the Chinese call it, burst through its southern bank near Kai-fung-Fu, which is a little above the place where the former disaster occurred ; the volume and force of the water being so great as to make an opening or gap four miles wide, where a moving mass of water, 12 feet high, rushed through, and, spreading in every direction, brought ruin and desolation over what had been before a most fertile and highly cultivated country.

The disaster has been so recent that we do not yet know its full effect; whether from the nature of the country the waters have formed a huge lake into which the river will hereafter run, as the Volga into the Caspian, or the Oxus into the Sea of Aral, or whether, following a channel or bed, they may, as before, find their way as a continuous river to the Yellow Sea. As the country is low and flat, the latter result appears the more probable.

It has been said that the Chinese dread this river more than war, pestilence, and famine. One of their emperors declared that looking after it gave him more anxiety than the government of the whole kingdom. Their records show that during the past 2500 years the river, below Kai-fung-Fu, the scene of the present disaster, has changed its course and found a new mouth no less than nine times. The geographical phenomenon of rivers changing their beds and forming new outlets has taken place in other countries, especially in Spain; but nothing on a scale of such magnitude as the changes of the Hoang-Ho has occurred in the past history of the world.

In 1883 Mr. Colquhoun, at the head of the Wahab Expedition, made a journey from Canton through the province of Yunnan, in China, the most broken and mountainous peopled country in the world, and thence across China to Bhamo, in Northern Burmah. It was a most difficult and exhausting journey, over roads terribly bad, food being poor and scarce, except in the towns; the inns miserable. Along the route they found traces of the great rebellion in very numerous ruined villages, and other evidences of a past prosperity. Two

thousand miles of the route were surveyed, embracing the whole of Southern Yunnan, along a route of great importance, hitherto untrodden except by the Chinese. Their way was very much obstructed by officials and others, but the aboriginal people were found kind and hospitable.

M. D'Angis ascended the Hai-Ho, or Black River, in an attempt to reach Yunnan in South-west China, and the river was found to be impeded by 54 rapids.

Mr. Boulangier made a journey in Siam and Cambodia. He found that Upper Cambodia was a fertile country, and that Lower Cambodia was under water during four months of the year, so that the raising of rice is alone profitable.

The occupation of Cochin China by the French has resulted in a material change in the political geography of this part of South-eastern Asia. They extended a protectorate over Annam, the long and narrow country lying between Siam, the Shan States, and the ocean, and afterwards conquered Tonquin, lying between Annam and China, with the declared object of finding a commercial entrance into the rich Chinese province of Yunnan, by water, along the Song-tai River, which runs through Tonquin to the Gulf of Tonquin, in the China Sea, and they have now extended a protectorate over Cambodia, with a design of forming a French Indo-Chinese Empire. The character of the people of Annam and Tonquin, already debased by vices and bad habits, has not been improved by their contact with the French.

BABYLONIAN RECORDS.

Before mentioning the travels and explorations of M.

and Madame Dieulafoy in Northern Persia, which have an interest alike geographical and archæological, and with which I shall close my address, I may mention that the explorations upon the sites of Nineveh and Babylon have brought to light information showing that many things supposed to have come into use after the Middle Ages are of remote antiquity. M. Revillout, from the study of the clay tablets, or bricks, as they are called, has found that the Chaldeans had banks where the depositor could open a credit, drawing upon what he had in the bank, as in modern times, by a check. He could either open a credit with a bank, or deposit his capital there for security. Mortgages were extensively in use among the Babylonians, drawing an annual rate of interest. Guardians were appointed for minors or married women, whose parents were dead. Prisoners were released from confinement upon giving bail, that is, upon their friends giving security for their appearance, and associations were formed for the carrying on of a business either as partnerships, or somewhat in the nature of our modern corporations. Truly it may be said with Solomon, there is nothing new under the sun.

PERSIA.

The French Minister of Public Instruction sent M. and Madame Dieulafoy, with Babin and Houssay, to make excavations at Susa, the Biblical Shushan, the Palace, as it is called in Scripture, and to secure for the museum of the Louvre what antiquities might be found. Mme. Dieulafoy, who went with the expedition, displayed a courage, zeal and energy so extraordinary that the Government made a special recognition of her services.

The collections made for the museum weighed in all something like 60 tons, and these had to be transported from Susa to Bassora, a distance of 250 miles across a desert country.

With this expedition to Persia, one of the early seats of human civilization, I may appropriately bring to a close this account of the recent geographical work of the world.

U. S. COAST AND GEODETIC SURVEY.*

Among the contributions of value made to geographical knowledge in the progress of the work of the Coast and Geodetic Survey up to the close of the past year may be enumerated the following :

Upon the Atlantic and Gulf coasts the triangulation intended to define accurately the coast line, and to determine in geographical position all important harbors, landmarks and aids to commerce and navigation has been nearly completed. Short gaps remain to be filled upon the coasts of North Carolina, Alabama and Louisiana, and work upon two of these is now in progress. Triangulation of outer coast line is entirely completed from Maine to Texas, except two or three bases of verification being measured the present winter. The points referred to in North Carolina, Alabama and Louisiana are simply bays and harbors. As soon as appropriations become available, certain connections of the main triangulation along the Appalachian chain with the coast triangulation must be made, and the triangulations on the east and west coasts of the peninsula of Florida must be united on a line from Fernandina to Cedar Keys. For the purposes of geodesy it will be of interest to know that an oblique arc of the meridian, carried by the primary triangulation from Calais, Maine, to Atlanta, Georgia, a distance of some 1,200 statute miles, has been completed nearly to Montgomery, Alabama, and that operations are now in hand for extending this arc to the Gulf Coast at Mobile, thus securing the measurement of an oblique arc of twenty-two degrees.

Upon the Pacific coast the triangulation has covered all of the more important harbors and anchorages between San Diego and the Gulf of Georgia, and has made progress in South-eastern Alaska.

The topography, which by the organic law of the survey is executed for purposes of commerce and defence, has followed closely and nearly kept pace with the advance of the triangulation upon the Atlantic and Gulf coasts. Excepting the topography of rivers to the head of ship navigation, it may be said to be practically continuous on these coasts from Passamaquoddy Bay to the Rio Grande, the only gaps remaining to be filled being at the north-eastern extremity of the coast of Maine ; on the west coast of Florida, between Cape Sable and Cape Romano ; at

* For these notes I am indebted to the kindness and courtesy of F. M. Thorn, Esq., the Superintendent of the United States Coast and Geodetic Survey. C. P. D.

Perdido Bay ; at Atchafalaya River and Grand Bay, and on the coast of Texas, between Sabine Pass and Vermilion Bay.

In all of the more important localities on the Pacific coast the topography has been finished. On the coast of California it has been completed from San Diego to Trinidad Head, with the exception of two gaps. On the coast of Oregon a number of gaps are yet to be filled, mainly of stretches of coast where no harbors exist. The topographical surveys in Alaska have been of a preliminary nature.

In the interior States no opportunity has been lost of extending the determinations of geographical position under the law providing for a geodetic connection between the Atlantic and Pacific coasts. This connection, which is being carried across the continent by a belt of primary triangulation near the 39° parallel, is now about two-thirds completed. The elevated peaks of the Coast Range and of the Sierra Nevada, in California and Nevada, and those of the Rocky Mountains in Utah, have helped to carry long lines of primary triangulation, advancing eastward to connect with similar triangulation proceeding westward from the Atlantic coast. Recent primary triangulation in Utah has developed, as a part of this scheme, four lines ranging in length from 140 to 150 miles, between mountain peaks ranging in elevation from 11,800 to 13,100 feet. The advance of this triangulation, with the continuation and extension of that in the several States which have made provisions for their own topographical and geological surveys, is gradually providing a basis upon which the States interested can make trustworthy State maps.

Not a few inquiries of scientific value have light thrown upon them in the course of the occupation of elevated mountain peaks for geodetic work ; among these there is the effect of mountain masses upon the direction of the vertical. Special attention was given to this subject in the course of the year by an officer of the Survey detailed for duty with the Hawaiian Government Survey, at the expense of the latter. Determinations of latitude and gravity upon the Hawaiian Islands were made under conditions exceptionally favorable for observing changes in the direction of the vertical dependent upon the great depth of the sea, the volcanic formation of the mountains, and their distance from the masses of the continent. At Kahuku, on the windward side of Oahu, preliminary reductions have shown a difference between the astronomical and geodetic latitudes of nearly a minute of arc, one of the most striking examples in the world of deflection of the plumb-line from mountain attraction.

The hydrographic work of the Survey is now practically complete upon the Atlantic and Gulf coasts ; the only gaps remaining to be filled being in Cobscook Bay, Maine ; off the west coast of Florida, and on the Gulf coast west of the Passes of the Mississippi. Upon the Pacific coast all of the chief harbors, anchorages and roadsteads, with their approaches, have had their hydrography finished ; the stretches of coast that yet remain are those where the interests of commerce and navigation are of least importance. But the effort is to finish these also as soon as practicable. Hydrographic work in South-eastern Alaska has been pushed with great energy ; during the past year an area of 1,600 square miles was covered, and over 17,500 miles of soundings were run by the combined parties, the localities being Clarence and Sumner and Wrangell Straits.

In the domain of physical hydrography the most notable researches were those which led to the announcement of the laws of the circulation of the sea through New York Harbor (Appendix No. 13, 1886) and the observations of currents in the Gulf Stream, carried on with apparatus specially devised for the purpose and perfected by trial during several seasons of Gulf Stream exploration. (Appendices 14, 1885; 11, 1886, and 8, 1887.) During the past season observations of currents were made upon lines crossing the Stream, or normal to its course, between Rebecca Shoal and Cuba; between Cape San Antonio, Cuba, and Yucatan, and from Cape Hatteras Shoal south-east, currents being observed at a number of stations on these lines at much greater depth than ever before attempted, the steamer being safely anchored at each station. The greatest depth of anchorage was in 1,852 fathoms, off Cape Hatteras, and that, too, with a surface current of over four knots.

It is anticipated that one result of these investigations, if the means afforded of prosecuting them are continued, will be to ascertain the effect of the tides upon the currents of the Gulf Stream, and supply the mariner with tables predicting these effects and the amount of daily variation in the current, its depth and velocity at different depths. A notice to mariners embodying such predictions has, in fact, already been issued from the Coast Survey Office, which now issues a monthly notice to mariners, covering all dangers, changes, etc., developed since the last previous notice. The Survey is now issuing, gratuitously, Index maps and a graphic catalogue of its charts.

Besides its work on the primary survey, the Bureau continues, whenever needed, re-surveys of harbors and bays, and, incidentally to its main work, it has aided the States of Connecticut, New York, Maryland, Virginia, and North Carolina in the development of the area and availability of their oyster grounds. It has aided in rectifying the boundaries of several States. It has published charts of the magnetic declination, dip and intensity throughout the United States. Appendices 12 and 13, Report of 1882, contain data indicating variation of the needle anywhere in the United States during the last century, or for a quarter of a century to come.

ANCIENT CITIES OF AMERICA,*

BY

PROF. FREDERICK A. OBER.

It is of an old world I shall write to-night, not the Old World of the historian and geographer ; not of the Orient, but of the Occident : the Old New World of which our own Continent forms a part. This continent, declares the highest authority, "has also its past, for facts show that, while America may be called the New World, in consequence of having been the last to come under the general knowledge of geographers, it is from most points of view, an old world. It abounds in the oldest known strata ; it has yielded some of the oldest remains of man, indicating that he has been long a denizen there ;

* The illustration (frontispiece) represents the ruins of Uxmal in Yucatan. To the left, in the distance, (and hardly seen in the picture) is the Casa de la Vieja, or Old Woman's House ; next comes the Casa del Gobernador, or Governor's House, showing the west front and about three-fourths of the building ; to the right of this and below it the Casa de las Tortugas, or Turtle House, so called from a row of turtles in regular succession above the upper cornice ; and behind this a great pyramid with a broad platform and without a monument and known as the Cerro de los Sacrificios, or Hill of Sacrifice. To the right of this pyramid is another, built in stories and surmounted by a fine temple, now in ruins.

Still to the right, and more in the foreground, is the curious building known as the Casa de las Palomas, or Pigeon House, from the vast triangular peaks which rise from the decorative wall that surmounts the edifice.

In front of these buildings, and buried in the forest in the middle ground, are other ruins, the most remarkable of which is the Tennis Court ; and last of all stands, in the foreground, the southern wing of the Casa de las Monjas, or Nuns' House, with the great doorway, which afforded access to the inner courtyard, where are still to be seen remnants of the pavement.

and it has afforded evidence of a civilized era which may even have preceded that of Western Europe."

But in a recent number of the London *Spectator* (May 17, 1884), I find this query: "Why do Europeans, and especially we English, (who spend so much time in ransacking the history of the past) do so little towards the investigation of the early history of America? Because it is the Americans' work? If so, then the Americans perform it very badly."

And then the writer proceeds, while at the same time expressing great respect for me and my work, to decry my method, and the American method of exploration. He is welcome to his opinion. But why, indeed, have not the English engaged in these explorations? Is it not because they have persistently refused to recognize that our country had a past? Have they not always denied that we had any claims, even upon the regard of the Old World, because, forsooth, we had no ruins, no antiquities, no historic age long past?

But, at last, the scales seem to have fallen from their eyes; they admit our antiquity; we may have had ancestors!

Why needs a man to have been born a Briton, to possess the qualifications for a successful explorer? What does it signify, that I myself am some two centuries removed from my English ancestry, so long as I am of Saxon origin? And are not the libraries, the galleries, the museums, and the antiquities of the East as accessible to me as to the European?

But let us not complain; it is a great and significant admission that, in the eyes of Europe, the halo of antiquity invests us!

“ World wrongly called the New, this clime was old
When first the Spaniard came, in search of gold.
Age after age, its shadowy wings had spread,
And man was born, and gathered to the dead ;
Cities arose, ruled, dwindled to decay,
Empires were formed, then darkly swept away ;
Race followed race, like cloud-shades o'er the field,
The stranger still to strangers doomed to yield.”

Nowhere in the Western World had an ambitious architecture been disclosed, until Yucatan was discovered—that mysterious peninsula, which extends like a beckoning finger from the Mexican main into the Caribbean, towards Africa and the Atlantic.

Hernandez de Cordova, in 1517, first sailed along its coast, and saw, gleaming white above its strand, towers and walls of glistening lime and stucco. Other temples and idols were found by Grijalva, in the year following, at the north-eastern extremity of Yucatan, as well as on the Mexican coast ; to which Cortes, in 1519, and other voyagers subsequently added numerous examples, scattered throughout Central and Southern Mexico.

In order more fully to comprehend their scope and importance, by comparison, let us leave Mexico for the moment and glance at the pre-historic monuments of the United States.

The eastern coast of our Continent was inhabited by red men—Indians, (so-called) who possessed no fixed habitations, nothing else than temporary huts and wigwams, and whose knowledge of the arts was confined within a very narrow circle of acquirements. These wigwams of deer-skin, or buffalo-hide, or the bark of trees, were the dwellings of the nomadic peoples found in occupation by the “ discoverers of America :

“ Very spacious was the wigwam
Made of deer-skin, dressed and whitened.”

And of its occupant, we read in *Hiawatha* :

“ Straightway from the shining wigwam
Came the mighty Megissogwon ;
Tall of stature, broad of shoulder ;
Dark and terrible of aspect ;
Clad from head to foot in wampum,
Armed with all his warlike weapons,
Painted like the sky of morning.”

We cannot deny that the Indian, in his native wilds and costume, is picturesque and extremely attractive.

Taking cognizance merely of these wanderers, let us now turn to a different section of our territory. While noting that, save for insignificant earth and shell heaps, they left no remains worthy of notice, we will direct our attention farther westward.

It is well known that the most ancient works of any extent, of an early people in our territory, are those of the Mound-builders, whose home seems to have been mainly in the Mississippi and Ohio valleys, extending northward, as the traces of their occupation show, as far as Lake Superior, southward to Florida and the Gulf of Mexico, and from the base of the Alleghanies up the valley of the Missouri. We learn with wonder of these great earth mounds ; at Miamisburg and near Newark and Marietta ; of the graded way at Piketon, and the monster mound at Grave Creek—a truncate cone, 78 feet high and 900 in circumference ; of Cahokia and Fort Ancient ; of the works in Washington County, Miss. ; of the Stone Fort and the wonderful stone graves of Tennessee so rich in crania and relics.

We find mounds in the shape of serpent and of mastodon, mounds containing graves, and even plastered rooms, "sacrificial altars," and innumerable specimens of ceramic art, implements and ornaments. With this casual reference, we must leave these Mounds, among which I do not feel at liberty to wander, since they are, in a measure, pre-empted by distinguished archæologists. The Mound-builders have left no enduring monuments of stone ; yet these earth structures are well-nigh indestructible ; and we trust may yet yield some relic of their builders that shall disclose their origin—still shrouded in mystery.

Let us turn our attention further to the West. Here we find in portions of New Mexico and Arizona, the semi-civilized Pueblos, living in vast communal buildings of adobe.

Evidence is lacking, perhaps, as to their great antiquity as a people ; yet, though we may not declare that their original structures were coeval with the mounds, we cannot disregard them in a paper on the ancient habitations of America.

These Pueblos are most numerous in the upper valleys of the Rio Grande, such as Taos, Pecos, Zuñi, Acoma, etc., and scattered throughout New Mexico and Arizona. Perhaps the northernmost is Taos, north of Santa Fé, one of the oldest at present occupied, built in two villages, in a fertile valley, on either bank of a gently-flowing stream. Its base story is 400 feet long by 150 wide, and the whole pyramidal pile 50 or 60 feet in height.

At Pecos, not far from the Hot Springs of Las Vegas, was maintained the sacred "perpetual fire," long cher-

ished by the people; the fire which died away at the dissolution of the tribe, when the American army approached New Mexico 40 years ago.

Wonderful structures are these pueblos, of a type unknown elsewhere in America. They are built mainly of adobe, a sun-dried brick, in successive terraces, the roof of each story forming a platform before the entrance of the one above. The style of architecture, as seen in the roof tops of the pueblo of Zuñi, is peculiar. There are no stairways but only rude ladders, by means of which access is had to the upper rooms, and the houses are provided with queer chimney-pots, and clay ovens, in which the Indians bake their bread. The original locations of most of the pueblos were upon the summits of great cliffs and *mesas* or table-topped hills, inaccessible except at one or two points, and hence capable of being defended against their numerous enemies. One pueblo, which I visited 3 years ago, that of Acoma, is built upon a mesa nearly 300 feet in height, access to which is only had by two tortuous paths cut in the solid rock—everywhere else the sides are perpendicular, so that the situation is entirely impregnable.

In the year 1530, word was brought to Mexico that there were great cities in the vast and unexplored North, cities of fabulous wealth, inhabited by cultured people. In 1540, a great expedition was organized, and the brave Coronado, with his soldiers, went in search of these famous cities. They found them at last, but found in them no wealth of gold or silver. Zuñi was the centre of the group known as the *Seven Cities of Cibola*, now in ruins; another cluster was that of Tusayan, now occupied by the *Mokis*, a people strange and interesting.

They also were perched upon almost inaccessible *mesas*, which the Spaniards found it difficult to capture, such a torrent of rocks and stones was rolled down the precipices upon their heads, as they stormed the Moki citadels.

The Moki city pueblo of *Hualpi* we may find to-day, frowning from its secure fastness upon its rock-ribbed *mesa*. The dwellings of its people are built like swallows' nests, in the crevices of the rocks.

But there are other structures yet more ancient than these pueblos, and not to be neglected even in a brief summary. These are the Cliff Dwellings, found in portions of Utah, Colorado and Arizona. Aerial dwellings, perched amongst the all but inaccessible cliffs of vast cañons and gorges; now existing in solitude, and long since abandoned by their builders, of whose history we know absolutely nothing. Silent and deserted, we find them now; it may have been ages since they were abandoned, long enough for important meteorological, perhaps even for geological, changes to have taken place. Many of them are built in caves and caverns, several hundred feet above the beds of ravines, and reached solely by precarious paths leading up the faces of almost perpendicular cliffs. With the impending rock high above them, the inhabitants of these cliff-fortresses securely entrenched themselves in such retreats as the gloomy Colorado cañon, with its mile-high walls of rock.

I have said that the ancient *Pueblo* people long preserved in their *estufas* what was called the *perpetual fire*. They also cherished, we are told, a tradition of the coming of a deliverer, who was to free them from

the slavery to which the Spaniards (at one time) reduced them. Every morning, as the sun rose above the horizon, they would watch from their roof-tops for the coming of Montezuma—a culture-hero nowise identical with the Aztec emperor of the same name.

The Pecos tradition says that Montezuma was born of a virgin, and as he grew up herded sheep, with an *eagle* to keep him company. The eagle is regarded with a peculiar veneration by the Pueblos; they keep eagles in cages and tame them, so that they become attached to their captors. The eagle of their tradition took their Montezuma upon his back and flew with him to Mexico, where he became the head of a great people.

But it is not for us to linger longer on the borders of Mexico, nor to indulge in speculation as to the people; profitless will it be, unless from abundant proofs we can educe something to enlighten us as to their origin, or discover their connection with a cognate people. These three great areas of dissimilar remains, the Mounds, the Pueblos and the Cliff-Dwellings, lie to the north and north-east of Mexico. Between them and the ancient cities of the South is a vast territory, with hardly a vestige of fort or dwelling; yet traces remain—infrequent ruins—that suggest, if they do not indicate, a connecting link in the chain of pre-historic, semi-civilized peoples of America.

We find these traces in the ruins of the *Casas Grandes*—the Great Houses—of the rivers Gila and Salinas, in Arizona, and in the north-western corner of Chihuahua, a northern State of Mexico. These buildings, some of which were 800 feet in length by 200 in breadth, are of *adobe* brick, and in terraces (like the

Pueblos) and have been in an abandoned condition since the time of earliest Indian tradition. No one knows who their builders were. There are no related ruins in any of the border States of Mexico.

According to the story, the Aztecs came originally—or at least, first emerged out of the obscurity of the past—from the north-west, from the section in which lie the *Casas* groups. It may have been situated here, that “Land of Whiteness,” Aztlan, “Country of Herons,” where the little bird sang to the Aztec priest the seductive song: *Tihui, tihui!*—“Let us go; let us on!”

They went, at all events, migrating from Aztlan, and this is the first traditional intimation we have, about the middle of the 12th century, of the people later known as Aztecs, or Mexicans. Their own picture-writings show them as living in the caves of Chicamoztoc, their subsequent migration, and their barbarous, nomadic life, when they subsisted entirely upon the chase and the wild plants of the field. And again, as settled at Tezcoco, and engaged in the pursuits of agriculture, being surrounded by figures of the maguey, cultivated cactus, and other plants.

It is only on and near Mexican territory that we encounter any tradition whatever of ancient peoples or ruins. About the end of the 12th century, the Aztecs, (still pursuing a southward course) arrived at the Toltec city of Tula, where, after a halt of 50 years or more, they went on into the Valley of Mexico.

In the Mexican Gallery of Art, there is a painting which vividly depicts the types and conjectural costumes of that ancient period. It commemorates the discovery of pulque, and represents the beautiful princess, Xochitl

(the flower of Tollan) presenting the first cup of the precious beverage to her sovereign. This event is said to have taken place about 1025.

Five hundred years before—about the year 700, if we may accept the earliest chronicles of Mexico—there arrived here, out of the darkness that shrouded their origin, another people, known to history as the Toltecs, more advanced than any other Americans of that time in the arts of civilization. They here built Tula, or Tollantzingo, the remains of which—groups of *adobe* walls, a “zodiac,” sculptured “hieroglyph” and some colossal caryatides—may still be seen, and must be regarded with peculiar interest.

Here another thread leads us back into that misty country of Indian tradition to the northward, for Toltec chronicles point to the north-east as the home of this race or nation. Thus we have two lines of migration leading, conjecturally, at least, out of the mysterious North, and converging at the margin of the Valley of Mexico, subsequently world-renowned as the centre of Aztec supremacy and the seat of their capital city, founded here in 1325.

Tenochtitlan, the City of the Cactus Rock, which grew to be the centre of Aztec supremacy and power, was founded on an island in the middle of Lake Tezcoco; the date of its erection and the migrations which preceded it are emblazoned on the Aztec picture-writings. The Aztec priest had prophesied that when they should find an eagle perched upon a cactus, with a writhing serpent in its claws, there and then they should rest; there they should build their capital. It was on an island in Lake Tezcoco, in the year 1325, that they

beheld the promised sign. Here they settled, and here grew to be a great and powerful people. At the coming of the Spaniards, in 1520, the ancient capital disappeared, for the Spaniards only took it house by house, and stone by stone, tearing down temples and palaces and filling up the canals with the *débris*; but many places remain that were identified with the conquest and with the Aztecs, and which are fully authenticated. In entering the city for the purpose of observation, we naturally turn our footsteps toward the *plaza mayor*, the great central square, for it was also the centre of the former city, and indicates the site of the Aztec *teocalli*, or temple of sacrifice. Recent excavations, made in the summer of 1881, have brought to light the very corner-stones of this sacred edifice, and have thus vindicated the statements of early historians.

According to the best authorities, this building was a pyramidal structure, truncate, built in successive stories, each of which was reached by a flight of steps only after passing around the entire pyramid. One hundred and fourteen steps led to the square platform at the summit, about one hundred and fifty feet above the ground. This was the temple of their war-god, Mexitli, or Huitzilopochtli, and their place of sacrifice.

And do we find here any of the vast structures described by the Conquistadores? Any of the mighty *teocallis*, or temple-pyramids? Are there any remaining of the temples and palaces, with vast enclosed courts capable of holding 3,000 men—the halls of Montezuma and his royal father, Axayacatl? No! Not a vestige remains of the ancient Aztec City. Idols, calendar stones, many minor objects of antiquity have been re-

covered—the National Museum is full of them—but of the edifices themselves hardly a trace may be discovered. If I were describing merely the works of the aborigines, the sculptured stones, such as the war-god, *Huitzilopochtli*, the Sacrificial Block, and the Calendar Stone, I might mention many interesting objects connected with those departed days. But these remains pertain more especially to their arts, their religion, and a description of the aborigines themselves. Hence we pass them by, and hasten to those grander works which belong to an era preceding that of the Aztec.

Yet we cannot neglect the great Sacrificial Stone, about which are clustered historical associations more sacred, and lies more stupendous, than about any other object of antiquity in the world. For, say the old historians of Mexico, upon this stone, with its sculptured border of conquering kings, were slain the prisoners taken by the Aztecs in battle; not less than 70,000 in one year—at the time of its dedication. How many thousands since, no one knows; but it, doubtless, has been well soaked in the blood of the slain.

Near to, and overlooking this sacrificial block, stands now—as it stood four centuries ago—another relic of those dead days of Indian idolatry: their first and most famous god of war, *Huitzilopochtli*, before whom all those barbarous sacrifices took place. These two sculptures are doubtless of Aztec origin; but another—still existing in Mexico City—where it may be seen cemented against the western wall of the Cathedral—the so-called “Calendar Stone,” must have been a work of the Toltecs. It is a large block of basalt, 11 feet in diameter; various interpretations have been given of its sym-

bols ; but I will not attempt to decide, when even the archæologists differ among themselves. Its central figure represents Teotl, the sun deity, and those in the margin, possibly, the zodiacal signs, by which those clever Toltecs calculated the recurrence of the equinoxes ; or at least, of their feast-days and festivals.

Shall we lament the total destruction of the ancient Capital, as an irreparable loss ? If we reflect that the date of the founding of Tenochtitlan was but 560 years ago—when its first rush huts were constructed, we shall not be likely to consider the demolition of its buildings as of great import.

Every ruined city of Mexico antedates the Aztec epoch ; every group is, moreover, *pre-historic* ! But is there anything remaining to tell us of those most ancient of peoples who preceded the Aztecs ? Yes ! Seeking again the verge of the Vale of Anahuac, we shall find magnificent monuments, in the pyramids of San Juan Teotihuacan, about 40 miles distant from Mexico City. There are two : the Pyramid of the Sun—*Tonatiuh Iztacual*—is 200 feet high, with a base-line of 700 feet ; the Pyramid of the Moon, 130 feet high and 500 square, contains a deep well in its centre, to which leads a narrow gallery. These pyramids are of earth, but were once faced with cut stone, and a golden sun and a silver moon are said to have once glittered on their respective summits, guiding to this holy place—*Teo-ti-hua-can*,—"City of the Gods," vast throngs of worshippers.

An unexplained and perplexing feature of this locality is a long avenue lined with little mounds called the *Mico-at-li*, or "Path of the Dead"—*Camino de los Muertos*. Another is the great abundance of terra-cotta figurines,

grotesque in feature and singular in design, which may be found scattered broadcast throughout the adjacent fields. These pyramids may be Olmec, Toltec, Totonac, or even the work of the Quinames—or antediluvian giants—but it is beyond a shadow of doubt that they were built by a people about whom history is silent.

About 60 miles distant, south-east from the City of Mexico, at an elevation above the sea of nearly 7,000 feet, is the largest structure of the plateau, the world-famous Pyramid of Cholula. It is built of *adobe*, mainly in alternate layers of brick and clay, rising in terraces to a height of 200 feet, with a base-line of 1,000 feet and a summit platform nearly 200 feet in breadth. It has, at the present day, more the appearance of a natural elevation than an artificial one, though no doubt exists as to its artificial character; for in cutting a road, some time ago, a section was detached, revealing a square chamber of stone, with a roof of cypress beams, which contained some interesting antiquities.

Cholula, even so late as the arrival of the Spaniards, was a most holy place, in Indian estimation, and set apart for the priests of Quetzalcoatl, "God of the Air," a temple dedicated to whom adorned the summit of the pyramid. This, the largest pyramid of the New World, naturally suggests comparison with the grandest structure of its kind in the Old World: the great pyramid that lifts its hoary head above the banks of the Nile. This, though twice the height of the Mexican pyramid, has but three-fourths its length of base. Cholula, in fact, is of about the same height as the third of the remarkable group at Ghizeh, with nearly three times its length of base; and the broad area of the Cholulan pyramid

would suggest that it has lost a large portion of its structure and that, in ages past, it must have reached a greater height. I myself have climbed its terraced sides—as also those of Teotihuacan—and have gazed for hours upon the pastoral plain spread at my feet, lost in contemplation of its beauties ; and have wondered whence came the civilization that had evoked this monument, and whither had departed the aboriginal culture that disappeared at the advent of the Spaniards.

All the ruins hitherto described are of *adobe*—of sun-dried mud ;—but there are others that differ from the table-land type in character of material and relative position. We shall find in the warmer regions alone, of Mexico, below the level of the plateau, those structures of stone that have excited the admiration of the world.

The first ruined structure of stone is on the western slope of the Cordillera, about 70 miles from Mexico City—a *cerro* 300 feet in height, with terraced sides, called Xochicalco, or “Hill of Flowers,” crowned by a building, 60 feet square, made of great blocks of porphyry. Beneath the crown of the hill is a series of caverns, with a main saloon 90 feet in length and walls and floors laid in cement. Crossing the plateau and descending its eastern slope, easterly from the Volcano of Orizaba, we find other ruins of stone. Buried in the fragrant vanilla forests, on the line of demarkation between the *tierra caliente* and the *tierra templada*, overgrown with the rank luxuriance of tropical woods, stands the Pyramid of Papantla, built in terraces, about 60 feet in height and breadth of base. A city stood here, in the time of Montezuma, which paid him tribute of cotton, corn, *chile* and grains of gold. In the same forests are the

ruins of Mizantla and Tuzapan, anciently cities of great beauty, with temples and sumptuous edifices. By referring to the map, we may note all the great groups of Mexico and Guatemala. And I wish to call particular attention to the fact—which I shall emphasize in my conclusions—that all the cities of stone, (with but few exceptions) are in the South—in the Isthmus of Tehuantepec and the Peninsula of Yucatan.

Returning to the table-land, and travelling southward, we enter the triple valley of Oaxaca, each arm of which is filled with mounds, and every commanding ridge guarded by vast and complicated earth-works. During an exploring tour of a thousand miles a-saddle, I hastily investigated these remains which indicate by their numbers the crowded population that must, at one time, or in successive ages, have gathered here. In the Valley of Tlacolula, running in the direction of Tehuantepec, is the crowning achievement of those ancient people, in the magnificent palaces of Mitla, than which no ruins in America are, in their peculiar style, more elaborately ornamented.

Humboldt, though he describes them, never saw these ruins. The first exploration was in 1802, by Don Luis Martin and Colonel De la Laguna from Mexico, who visited and sketched the ruins, and from whom Humboldt got his information. In 1806, Dupaix and Castañeda, and in 1830, the German traveler, Muhlenpfordt, made plans and drawings which were published, the originals of which may yet be seen in the Institute of Oaxaca. Muhlenpfordt's plan, given by Bancroft, is said to be the only general one ever published. The

French archæologist, Charnay, took photographs of Mitla a score of years ago.

There are five groups of ruins, three of which are in excellent preservation. A portion of the village is built among them, and lies near the bed of the shallow and treeless river. After crossing this river-bed you enter the little *adobe* hamlet, where the only vegetation is cactus and nopal, and find yourself unexpectedly amongst the ruins. As they do not lay claim to regard so much on account of their height as for their extent and elaborate ornamentation, the wall of the first rises before you while you are yet unaware of its vicinity. Though it contains some immense blocks of porphyry, and traces of hieroglyphic painting, its ruin is more complete than that of the second group, to which we anxiously hastened. The first collection is about one hundred and twenty feet by one hundred, and the walls, fifteen to eighteen feet high, enclose a large court, on three sides of which are rooms. The outer walls of all the ruins are composed of oblong panels of mosaic, forming grecques or arabesques. There seems to be no sculpture on the walls, but only this peculiar mosaic, formed of pieces of stone, each one about seven inches in length, one in depth, and two in breadth, accurately cut, and fitted into the face of the wall, forming patterns so complicated in their nature that only an engraving can properly represent them. The mosaic, all the figures of which are rectangular or diagonal, gives the distinctive character to Mitla that distinguishes it from all other ruins. The façades of the Yucatan ruins are carved, while Palenque is noted for its sculptures and stucco in bas-relief, and Copan for its idols and altars. We are over-

whelmed with the magnificence of this great work as a whole, and impressed by the careful execution of the details.

Beneath a wall of the northern building is an underground chamber known as the *subterraneo*, in the shape of a cross, each arm about twelve feet long, five and one-half feet wide and six and one-half feet high. The immense block of stone that covers the junction of the two galleries is supported by a monolith, called the "Pillar of Death," from a tradition that whoever embraces it will die before the sun goes down.

From its geographical position, lying between the two great systems of Yucatan and Mexico, Mitla seems to form a connecting link; for, while standing out peculiarly conspicuous in its singularities of architecture and ornament, these very peculiarities may be the product of the civilization of each country. It was the traditional religious centre of the ancient Zapotecs, called by them the Dwelling of the Dead. There are five groups of structures, each 120 feet by 100, with walls 16 to 18 feet high, enclosing a large court. There is no sculpture here, but a peculiar mosaic, formed of pieces of cut stone, fitted into the faces of the walls in patterns so complicated that only a photograph can properly show them. These oblong panels, forming *grecques*, all the figures rectangular or diagonal, give its distinctive character to Mitla. Some of the panels still exhibit traces of elaborate ornamentation in color; and in one case the *grecques* are cut in the solid rock. All the halls are at present roofless; but in one of them, called the "Hall of Monoliths," are six pillars of porphyry, 18 feet in height; unlike anything else discovered in America.

Massive blocks, some of them 16 feet in length, formed the sides and lintels of doorways.

The third group is the most interesting, since not only are the outside walls cut in mosaic, but there are several rooms and courts, the sides of which are a labyrinth of *grecques*. The lintels of this and the adjacent ruin are immense blocks of porphyry, one of which is 19 feet in length, a solid block of stone, raised to its present position by some lost process of engineering, certainly by one that is unknown to the Indians of to-day. The rooms are narrow, and at present open to the sky, but were once undoubtedly protected by a roof. But what distinguishes the ruins of Mitla from all other remains of Mexican architecture is, as stated by Humboldt, six columns of porphyry, 14 feet in height, which are ranged in line in the centre of a great hall. They are very simple, having neither pedestal, capital, nor architrave, but stand as almost the only examples of the kind found in American ruins.

Above these ruins is a stone church, in the central portion of this bench of the foot-hills on which they are built. We entered the curacy adjoining the church, which was simply the old building of the Indians, roofed with tiles, and were hospitably received by the cura, who recounted to us the traditions respecting his strange abode. This ruin is larger than the others, being 284 feet long and 108 wide, with walls 5 or 6 feet thick. Two great stone pillars, 12 feet high, stood in front of the door-way. The walls had the same ornamentation of diagonal mosaics, and the portion used as a stable contains the best preserved fragments of paintings in the ruins, of characters resembling the Egyptian, exquisitely

colored in red and black, the colors yet fresh and bright. The cura was very intelligent, though he had Indian blood in his veins, and he had very clear ideas as to the uses of the various buildings. The first group, he said, was probably used as quarters for the troops; the second, the largest and most elaborate, was the palace of the King of the Zapotecs, who came here two or three months in each year, as to a *buen retiro*; the third and highest building, from which and out of which the church was built, was used by the priests, and these paintings that adorned the panels in the walls were probably hieroglyphical, and in their custody. (See also, p. 541, "Travels in Mexico.")

How the aborigines moved those great monoliths, or how they so skilfully carved them, are secrets never yet penetrated by modern engineers; but their quarries are quite a mile distant from the city. With Mitla, ends the list of ruins found on the plateau, this group occupying a position on its extreme southern verge. But, although we have glanced at many groups, we have not yet penetrated into the region containing the noblest structures. At a point a little north of west of Mitla, far distant in the State of Chiapas—most accessible to us by the River Tabasco, from the Gulf of Mexico, lie what are universally acknowledged to be the most magnificent ruins in America.

"Palenque, seat of kings—

At every step some palace greets the eye:

Some figure frowns, some temple courts the sky."

This royal city, once the seat of ancient empire, is situated 8 miles distant from the modern town of Palen-

que, and though Cortes passed quite near it, in 1524, it was not discovered until 1750.

There are at least five great structures erected upon high mounds of vast dimensions, the grandest of which is the Palace—so-called—280 feet long by 180, but with a height of only 25, built of stone, with mortar of lime and sand, and with the entire front covered with stucco, painted in red, blue, yellow, black and white.

In sculpture and ornament, Palenque is richer than any other group of remains in America, its prominent features being the numerous bas-reliefs in stucco which take the shape, not only of plants and flowers, in delicate tracery, but of human figures, some of which—says an authority—"in justness of proportion and symmetry, approach the Greek models."

" We walk the rooms where kings and princes met ;
Frown on the walls their sculptured portraits yet ;
Strange their costumes ; ye see no native face—
Life, brow, and hue, bespeak an Ethiop race."

Which description, for a poetical one, is quite accurate. Pyramids, aqueducts, and numerous ruins far gone in decay, are buried in the dense forest. Besides the "Palace" are other grand edifices, and one, built upon a pyramidal elevation 110 feet high, and known as the *Casa de las Piedras*, is rich in stucco, bas-relief and hieroglyphic tablets.

Grouped about are, the "Temple of the Sun," "Temple of the Bean Relief," "Temple of the Three Tablets;" and in a ruinous temple known as "Casa Number Two," is a portion of the famous sculpture known as the "Palenque Tablet," containing that figure of the Cross, of mysterious origin. How came the builders of Palen-

que to possess the emblem of Christendom? No one knows; but there it existed, sculptured by some Indian Phidias; centuries, ages, perhaps, before the Christians reached America. It is not a sole example, others having been found in Yucatan. It is thought, however, to have been a symbol of the rain-god. A portion of this interesting tablet was torn from its position by vandal hands, and may now be seen in our National Museum; another lies buried beneath the mould of the Tabascan forest, while but one-third remains affixed to the wall in its original position.

Prof. Rau, of the Smithsonian Institution (to whom we are indebted for its restoration), publishes an interesting comparison between the glyphs sculptured on the tablet and the symbols of the Maya alphabet of Yucatan, belonging to a people who now occupy that peninsula. He assumes to find points of contact between the two, and only such differences as would naturally exist between the writings of a language at epochs perhaps thousands of years apart.

"It requires no practiced eye," says one, "to trace a resemblance in general features to Egyptian architecture; though it must be said that the details of the American, and the sculptures, are peculiarly original in design." Both Bancroft and Prescott find—"Between American and Egyptian sculpture, a very striking general resemblance, but while sculpture in Egypt is for the most part in intaglio, in America it is usually in relief. In the former country the faces are expressionless, always of the same type, and though executed in profile, the full eye is placed on the side of the head; in Ame-

rica, on the contrary, we meet with many types of countenances by no means lacking in expression."

Throughout several centuries, there flourished in Central America the great Maya empire of the Chanes, or Serpents, known as Xibalba, with its seat at or near Palenque. Its first establishment, at a remote period—probably about 1000 B. C.—was attributed to a being called Votan. Its language was doubtless the Maya, now spoken in Yucatan.

If we were to trace the extension of the Xibalban empire, or rather the ruins bearing an impress of Palenque, into Central America proper, we should find numerous examples; as at Ocosingo, and the Quiche capital, Ututlan; and especially at Copan, in Honduras, near the Guatemala boundary. There we find an immense wall enclosing an area 900 by 1,600 feet; a pyramidal terrace, 600 by 800 feet, of great blocks of cut stone, and an edifice called a temple. Most noteworthy at Copan, are sculptured pillars, idols, altar-stones, their backs covered with hieroglyphics, which could, no doubt, were the key once discovered, tell the sealed story of Copan's greatness. There is no nearer approach to the obelisk than the altar, or idol-stones of Copan, though these even fall far short of the granite monuments of the Nile. Traces of pre-historic man extend southward, through Central and South America, even to the highlands of Peru; but our present enquiry does not extend beyond the confines of Mexico: let us retrace our steps. The ruins of former races seem to culminate in the peninsula of Yucatan, in the wonderful structures that still remain a mystery to man.

Somewhere buried in the vast and impenetrable forest

of this region, is supposed to stand the mysterious "Silver City," its shining walls visible only at a distance, and said to be still occupied by the descendants of its original builders. Whether or no this be true, this vast wilderness contains the most glorious vestiges of former civilization on this continent.

The predominant characteristic of these ruins is, that all are built upon an artificial pyramidal elevation; the walls of the buildings are generally of great thickness, mostly of cut stone, richly sculptured;—busts, human heads, figures of animals, and hieroglyphics. The finest workmanship is displayed in broad and elevated cornices. Sixty-two groups have been discovered, many within a radius of 100 miles from Merida, the capital of Yucatan. None is more interesting than Uxmal, 60 miles distant, and which I first saw in March, 1881.

The first object that greeted me was a lofty pyramid, called the *Casa del Adivino*, or "House of the Sooth-sayer," up the steep sides of which we climbed, and on its summit, 105 feet above the ground, found a narrow temple 70 feet long and 12 deep, rich in carved hieroglyphics. A glorious spectacle was spread around us: to the west, directly below, was the *Casa de las Monjas*, or "House of the Nuns," in its ruins beautiful beyond description; south, the principal building of the group, the "House of the Governor," or *Casa del Gobernador*, raised upon its immense terraces, one of which also supported the "House of the Turtles" (*Casa de las Tortugas*), with the "Nameless Mound" beyond them all; east of south lay the ruins of *Casa de la Vieja* (the "Old Woman's House"), all tumbled about her head; from south to west circled mounds and clusters of ruins, such

as the "House of the Pigeons" (*Casa de las Palomas*), and the remains of an extensive series of buildings; beyond this city could be seen other ruins, perhaps other cities, reaching out in a long line that could be traced miles away.

"The dense wild wood that hid the royal seat,
The lofty palms that choked the winding street,
Man's hand hath felled, and now, in day's fair light,
Uxmal's broad ruins burst upon the sight."

By far the finest building of the city, conspicuous alike from its position and the completeness of its preservation, is the "Governor's House," the *Casa del Gobernador*. After the Conjurer's Pyramid, this was the next pile visited by us, and made the point of departure for subsequent excursions during the five days we remained there. It stands upon the topmost of three terraces of earth—once perhaps faced with stone, but now crumbled and broken. The lowermost and largest is 575 feet long; the second, 545 feet long, 250 wide, and 25 feet high; while the third and last is 360 feet in length, 30 in breadth, and 19 in height, and supports the building, which has a front of 322 feet, with a depth of only 39 and a height of but 25 feet. It is entirely of stone, without ornament to a height of about ten feet, where there is a wide cornice, above which the wall is a bewildering maze of beautiful sculpture. The roof was flat and once covered with cement, in the opinion of certain travelers, but is now a miniature forest of the indigenous shrubs and small trees of Yucatan—a hanging-garden of Nature's own formation, such as she covers every object with, in a few years, in this tropical portion of her domain. There are three large doorways through the

eastern wall, about 8 feet square, giving entrance into a series of apartments, the largest of which is 60 feet long and 27 deep, divided into two rooms by a thick wall. The ceiling of each room is a triangular arch capped by flat blocks at a height of 23 feet above the floor. The latter, like the walls and the jambs of the doorways, is of smooth, faced stones, that may once have been covered with cement.

Within a stone's throw of the "Governor's House" is a small building far gone in ruin, displaying workmanship of great skill, and sculpture chaste in design, and called the "House of the Turtles,"—*Casa de las Tortugas*. It derives its name from a row of turtles used as ornaments to the upper cornice. It may have served as the kitchen to the royal residence—accepting Indian tradition in regard to the names—but was once beautiful enough for a temple.

If the "Governor's House" claims attention from its conspicuous position and size, the *Casa de las Monjas*, the so-called "House of the Nuns," presents the greatest variety of sculptured forms and richest ornaments. It is composed of four buildings, the largest of which is 279 feet in length and not more than 25 feet high, and enclosing a court 258 feet long and 214 wide. The entrance is on the Southern side, through a high arched gateway 10 feet wide. There are no doors or windows opening on the outside, though there are in all 88 apartments opening upon the court.

The façades of this immense quadrangle are ornamented with the richest and most intricate carving known in the art of the builders of Uxmal. That portion forming the western boundary, at the left as one enters the court, is

the most wonderful of all ; for its entire length of 173 feet is covered by two colossal serpents, whose intertwined bodies enclose a puzzling variety of sculptured hieroglyphics.

These twin serpents represent *Kukulcan*, the "Feathered Serpent," identified with the Aztec God of the Air, Quetzalcoatl. In another decade of years it is possible that this grand conception embodied in stone by the Indian sculptors will be mutilated beyond repair, as a great portion of the wall has already been torn away for building purposes. Yuccas and other semi-tropical plants adorn the roof and also the ground in front, rendering approach to it somewhat difficult. At the southern end of the court the folds of the serpents surround a standing human figure, now much mutilated, a subject rarely used in the ornamentation of these buildings. If the drawing by Catherwood, made 40 years ago, is correct, all the faced stone below the figure has been torn away since he was there. The northern and eastern façades have been greatly injured since his visit, and most of the grotesque ornaments, the rosettes and heads, broken or wrenched entirely away. The hand of man, indeed, proves more ruthless than the hand of time.

These three structures comprise the principal buildings at present in a state of preservation that makes them of interest to the general traveller. There are others, even in this group, (as mentioned in the view from the high mound), but they are in such a state of ruin that their original form is obliterated.

South from Uxmal are the extensive ruins of Kabah, where are buildings with fronts of 150 feet, and lavishly ornamented. Unlike the façades of the buildings of

Uxmal, which were only decorated above the doorways, those of Kabah were "ornamented from their very foundation." Stephens also adds: "The cornice running over the doorways, tried by the severest rules of art recognized among us, would embellish the art of any known era; and, amid a mass of barbarism, of rude and uncouth conceptions, it stands as an offering by American builders worthy of the acceptance of a polished people." At Labná the sculpture is profuse, grotesque, and florid. Of the sixty or seventy ruined cities scattered throughout Yucatan, none offers points of greater interest than Uxmal. The ruins of Copan, in Honduras, are distinguished for the number of idols and altars richly sculptured; those of Palenque, in the State of Chiapas, for the profusion of stucco adornment, tablets, bas-reliefs, and statuary; Uxmal, for the richness of its sculptured façades, the magnitude of its buildings, and the chasteness and beauty of its statuary—judging from the few specimens discovered.

Thirty miles from Merida is the mound of Mayapan, an oblong pyramid, which is thought to have served as a gnomon mound, and several sculptured slabs. About 100 miles distant from the capital, east, are the ruins of Chichen-Itza, scattered over an area of 2 miles, and next in importance to those of Uxmal. The next most magnificent pile here is also called the *Casa de las Monjas*, which is very rich in sculpture. Another grand ruin is called the *Carcel*; this is a circular building standing on a double-terraced platform, and is 22 feet in diameter and 60 high; the *Casa Colorada*—or Red House—is highly ornamented, and has a stone tablet covered with inscriptions; while the most remarkable structure is the one

called the Gymnasium; two parallel walls 274 feet long and 30 thick, with two stone rings set in them mid-way their length, in the shape of two serpents with intertwined bodies. The hieroglyphic carvings of Chichen are of exceeding beauty, while its mural paintings (artistic in execution and of superior merit) represent warriors in battle and events in the lives of the various Itzac rulers. A carved eagle and lynx were found here, a procession of sculptured tigers ornaments one of the cornices; while the ornament known as the "elephant trunk" frequently recurs. This symbol (the elephant trunk) has long perplexed archæologists, who were unable to account for its existence; for the elephant was, of course, unknown to those ancient architects, though they may have learned (through tradition) of the mastodon.

It was here that Dr. Le Plongeon (a recent explorer) disinterred the monolith known as Chacmol, a statue 9 feet in length, which was taken from him by the Government, and now lies in the Mexican Museum. He also claims to have discovered more recently (1883) 7 stone serpents, and a group of 15 statues, supporting a circular table.

Chichen is known to have been the abiding-place of the Itzacs—ancient inhabitants of Yucatan—after they had been driven from other portions of the peninsula; but all attempts to reconstruct their history from the scattered fragments left by tradition, and from the mural paintings and hieroglyphs, have met with little success. Older than Chichen (it is thought) are the pillars of Aké, an Indian province adjoining. Here, upon an artificial *Mesa*—or platform-mound—225 feet

long by 50 wide, we find a series of 36 stone columns, 14 to 16 feet in height. The early chroniclers tell us that these were intended, not as supports for temple-roof, or altars for sacred fires, but as *Katunes*, or calendar-stones. As each one represented (it is supposed) a period of 180 years, one antiquarian claims an undeniable lapse of nearly 6,000 years from the time the first stone was placed in position until the place was abandoned. These grand, suggestive, yet mute memorials of antiquity—these pillars of Aké—appear to me to be the oldest monuments of aboriginal civilization that our country can produce; they stand unique, the work of giants.

The locality of every one of these cities was determined by the natural features of the country. As there are no streams in Yucatan—above the surface—water is only obtained from subterranean rivers, to which deep caverns open. And these water-caves, called *zonotes*,—some of them a hundred feet in depth—are found in every group of ruins. They are reached by rude ladders of poles, up and down which scores of active Indians travel day and night.

A sacred shrine of the Mayas, where for a thousand years Indian priests are supposed to have burned incense of styrax and copal, is Izamal; where we may see to-day that gigantic head of stucco, its impressive face looking out over the plains once occupied by countless thousands of the Itzac race, now deserted by all save the ocelot and wild turkey.

We have now reached again the northern extremity of Yucatan, at the point where first the Spaniards saw, in 1517, buildings of lime and stone. Here is Tuloom,

but one example of the cordon of stone cities, temples, palace, drawn along their northern coast. Buried in dense forest are extensive buildings, sculptured rocks, altars, and painted walls. Now this entire coast region, once teeming with active inhabitants, is a wilderness. From the lonely watch-tower Tuloom—it is centuries since it echoed to the foot-fall of the sentinel—one may look out across a channel of the sea to Cozumel Island, where Cordova, in 1517, and Cortez, in 1519, found temples of stone.

Thus hastily sketched, you have had before you the more important of the ancient cities and pyramids of Mexico; many more, even, lie shrouded from human view in the tropical forests of Central America. Many and many a hieroglyphic record exists there, unread, undeciphered; many an inscription that might throw light on the early history of America, were but another Champollion to arise, and another Rosetta Stone found to put us in possession of a clue to the meaning of these mystic symbols.

Leaving for future examination the various minor objects of antiquity; the innumerable idols, articles of obsidian, metal, and ceramic art; leaving also for another occasion the tracing of hieroglyphic and linguistic affinities—the chain of evidence afforded by a study of sculptured stone and aboriginal languages, let us now ask first: What evidence of origin or antiquity do these ruins afford us? I assume: First, they are of great antiquity; this assumption being based upon internal and historical evidence. How great may not be permitted us of the present age to learn. But every group

under consideration, without an important exception, is pre-historic! Surrounding the works of the Mound-builders there is a veil of obscurity we may never be able to penetrate; not even the tradition of a tradition lingers. Of the cliff dwellings we know as little; of the Casas Grandes, nothing; and it is only as we approach the historic centre of Aztec civilization—the valley of Mexico—that we are made acquainted with myths and legends, “tales told by the old men,” regarding the occupation of Tula, Cholula and Teotihuacan. But these, even, do not give us anything satisfactory regarding their constructive epoch.

These were all silent cities, at the advent of the Spaniard; not one has been found occupied, either by its original inhabitants or by their descendants. Nor, so far as we can learn from native evidence, did the people resident in the country possess any knowledge that these cities had been occupied. Nightly, according to Indian belief, the spirits of their builders roam throughout the area of ruins, and woe betide the luckless redskin found therein after sunset!

Without committing ourselves to any hypothesis of origin we may, at least, safely assume for these ruins great age. All knowledge of their beginnings is forgotten; tradition cannot materially aid us in our search, but stronger presumptive evidence we cannot desire than that afforded by an examination of the forest growth, of the deposition of humus, and by the fact that nothing perishable remains. “Four hundred years ago (says Baldwin) the forest which covers Yucatan, Guatemala and Chiapas, was growing as it grows now, and it was there a century previous; how many additional centuries

no one can tell. If its age could be told it would still be necessary to consider that the ruins hidden in it are much older than the forest, and that the period of civilization they represent closed long before these trees had attained their growth. * * * We must consider, also, that the building of magnificent cities is not the first work of an original civilization! Its first period was more or less rude. Many ages must have been required to develop such admirable skill in masonry and ornamentation.

Let me remark, in conclusion, that no well-considered theory of these ruins can avoid the inference that most of them are very ancient, and that, to find the origin of the civilization they represent, we must go far back into the very deeps of "antiquity!"

We may grant that man has had a long residence in America; that his most ancient home appears to have been in the tropical portion, and further, that in no region is there such accumulation of evidence as to extreme antiquity as in that of Palenque and Yucatan! Another question arises: Whence came the builders of these cities?

Let us enquire into the possible sources of origin, as evidenced by analogy of structure, similarities of workmanship and adornment, and by the lines of migration, as shown by the distribution of the ruins.

The Jewish theory, which assumed the first settlers to have been the lost tribes of Israel, who came by the way of Behring Strait, after wandering an indefinite number of years through India and Asia, has been long since exploded; and successively abandoned have been the Malay, Arab, Japanese, Irish and Chinese theories—all.

in fact, that supposed civilization brought from the west or by sea. Not that it shall be denied that any of them may have landed on the coast, and have left an impress of their civilization, but they never could have come in sufficient numbers to have fixed it. Failing to find a resemblance in these remains to the Egyptian (says one writer), we look elsewhere in vain. They are different from the works of any known people ; of a new order, entirely and absolutely anomalous !

And of the Phœnicians : " If it were true that the civilization found here came from them it would be true, also, that they built in America as never anywhere else; that they established a language here radically unlike their own, and that they used a style of writing totally different from that which they carried into every other region occupied by their colonies."

In fine : " The particulars in which the Americans are shown to resemble any given people are insignificant in number and importance when compared with the particulars in which they do not resemble that people."

It requires some hardihood to advance the theory of an autochthonous people, that sprung from American soil, and here developed—with or without extraneous aid—a civilization *sui generis*. " But it is an opinion (says Bancroft) worthy the greatest consideration, and which may eventually prove to be scientifically correct."

As to the distribution of the ruins. Does this fact indicate anything : That all the stone cities are in the South, or on the eastern slopes of the Cordilleras towards the Gulf of Mexico ; or, if near the Pacific, only where the Gulf and the Western ocean approach each other most nearly ? We have seen that all the

structures of the plateau between New Mexico and Mitla are of adobe, or sun-dried clay ; while Mitla, on the extreme southern verge, is of a core of clay with stone facings and an intrusion only of stone ornament ! All those cities and pyramids celebrated in Aztec history—made familiar to all readers of the “Conquest”—sink into insignificance when compared with those of the South ; they lack the first elements of grandeur, stability and durability ; they are of mud ; while the magnificent works of the South are of stone—massive, quarried blocks, and ornamented with sculpture and painting. Let the eye range over the map of Mexico, and it will seek in vain for a prominent monument north of latitude 23° . Let it take a wider range, cross the Equatorial line, seek, in South America, the ancient home of the Incas, and it will be seen that none exists below latitude 23° south !

And is not this a significant fact : That the two tropics constitute the boundary to this wonderful civilization. In the tropic-belt alone was it developed. And, if we examine particularly the location of the Central American ruins, we shall see that only in the *tierras calientes*—in the hot regions—of Mexico and Yucatan are the vastest areas of stone structures !

Admitting, even, that there was an early immigrant element into Mexico—that the ancestors of the Aztecs (and possibly the Mound-builders) came down into this country from the north-west and north-east respectively, no one can point out any direct line of migration !

Between the Casas Grandes and Tula a thousand miles intervene ; more than a thousand between Tula and the mounds of Louisiana ! From an examination

of analogies of structure, as exhibited in more than superficial resemblances, we cannot trace this Central American civilization northward beyond the northern halting-place of the sun. The builders of those wonderful cities were indeed CHILDREN OF THE SUN, worshipping that luminary, basking in its beams, extending themselves not a degree beyond its most radiant influences.

Finally, the conclusion forced upon me is, that this civilization was either indigenous, or obtained from the East; either autochthonous, or influenced by an Old-World contact; but with a world older than Europe—older than Asia; Atlantis, perhaps, or a portion of our own continent now beneath the waves. “The grand enigma of our continent” is that wrecked empire in the wilds of Central America, in the solution of which is contained the secret of our past, and perhaps a note of guidance for the future!

THE COMMERCIAL GEOGRAPHY OF THE AMERICAN INTER-OCEANIC CANAL.

BY

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The work done upon the canal at Panama, and the commencement of active operations along the Nicaraguan route, make an examination of the commercial conditions of the area to be affected by a ship canal across the American isthmus, a matter of present and increasing interest.

In viewing the subject as a whole, one is led to compare the American canal with that of Suez, and to be especially struck with the fact that while the Suez Canal has caused a diversion and a shortening of trade routes already long in existence and between thickly populated and long developed countries, the American canal will open a direct route to the Pacific, an ocean of comparatively modern discovery, and will bring within reach countries for the most part of recent settlement by civilized people, and only just entered upon an era of development which is already great, and promises to expand into amazing proportions. Hence while we look for a steady, though slow increase of trade through the Egyptian Canal, we may reasonably expect to see pass through our own, a trade increasing with great rapidity, simply to keep pace with the development and growth of the populations of our Pacific States, of the insular Pacific, and of the Australian semi-nationalities.

It is not considered necessary to discuss in these limits the saving in time, and distances that will be effected by the use of the trans-isthmian canal, for this has often been recounted, and an examination of the map of the world will readily show the gain in the principal routes. It is, perhaps, even unnecessary to remind the reader of the stormy and unfavorable winds, the tedium and the perils that must be encountered on the route to the Pacific from Europe and Eastern America by the way of Cape Horn. All these vexatious delays and hardships will be avoided by the new route to the Pacific, and the world may then be circumnavigated wholly to the north of the Equator, and with comparative quiet and expedition by way of the two great ship canals.

We may expect as the general effect of this canal upon our own country a great increase in the development, and importance of our trade. The expansion of our ordinary domestic and coasting traffic between the Atlantic and Pacific can readily be foreseen. But besides this we must bear in mind that the centre of gravity of our population is slowly but surely approaching the great continental valley of the Mississippi, and that this dense interior population will not only afford a great market for imports, but will also furnish for exportation a constantly increasing volume of products, which must pass by the long water communication through that river, its tributaries, and the canal, and thus reach freely and without transshipment all the countries of the Pacific. The development of our country will be thus accelerated simultaneously in its three great physical sections included within the general limits of the Atlantic and Pacific slopes, and the Mississippi valley. Is it

not then within the bounds of reason, to expect upon the heels of this enormous domestic trade, a foreign commerce unequalled in our history, and perhaps in that of the world? With the closing of various artificial trade channels—a result sure to follow on the use of this new water-way—not only will the world at large be benefitted, but more especially the consumers in our country. When we consider, for instance, that most of our Peruvian bark comes from England, that, except what we receive from Brazil, most of our crude India-rubber comes to us from the same source; that tea from China comes to New York in large quantities by the way of London and Germany, and that American hardware still reaches Australia by the way of London and Liverpool, we can realize how in some cases circuitous routes can be made straight and long distances shortened.

With the canal placed upon a strictly commercial basis, free and open to the shipping of the world, neutralized in time of war by the general agreement of all nations, its control will not be a military bone of contention, and the interests of this country upon the Gulf and the Caribbean can be guarded by a moderate, but efficient naval force stationed at places other than the terminal waters of the canal. The three plans that are now proposed for the solution of the question of ship transit across the American isthmus are:

First. The construction of an inter-ocean ship canal at the Isthmus of Panama.

Second. The construction of a ship canal and water route by the way of Nicaragua.

Third. The construction of an inter-ocean ship railway across the isthmus of Tehuantepec in Mexico.

The first plan is that of the Panama Canal. Ground was broken for this work in 1882, and it is still in the course of construction. It has met many very serious engineering difficulties, and the extravagant expenditure of money has brought the present company constructing it, to a state of financial distress. Up to the present time the French Government has refused to grant direct or indirect assistance to the company, and as the work is less than one-third finished, it is not unreasonable to consider its eventual completion a matter of reasonable doubt. There seems little question, however, that if it should ever be completed, its cost will be so great as to prevent its being a financial success to the company now constructing the work. As to the second, or Nicaragua route, nothing is being done in actual construction; but a concession from the Government of Nicaragua has been obtained by a provisional company duly chartered and organized under State law.

A company of engineers is now engaged in making a detailed and complete survey along the route preparatory to the work of construction. Although this canal company has not yet been chartered by the Congress of the United States, the route is the final result of the many surveys carried on at various times and in different parts of the isthmus by officers of the U. S. Navy and under the auspices of the Government; and it is the favorite route in this country. Although this work can be carried on without a charter from the U. S. Congress, the final construction company have applied for its sanction, and have reasonable assurance that the

charter will be granted before the end of the present session.

The third plan proposed for the inter-oceanic transit to the Pacific was that urged by the late Captain Eads for the construction of a ship-railway across the isthmus of Tehuantepec. The concession for this project has been granted by the Mexican Government, and is couched in terms which make it virtually a Mexican affair. It has not as yet secured an additional charter from the Congress of the United States, but can, of course, proceed without one. This scheme of transit is so foreign to the ordinary methods of navigation, that, though in a limited or occasional way it may be made an engineering success, the possibilities of frequent mechanical derangement are so great that for this reason alone, without considering many others, the writer fails to see how it can ever become a commercial success, or solve the great question of inter-oceanic transit. The death of the promoter upon whose fame, gained in undertakings of a different nature, this scheme seemed to rest, will, I think, be a fatal blow to the enterprise. In the examinations and discussions that follow, this plan will not be taken into consideration.

In examining and comparing the various routes to the isthmus, the proximity of the terminal points of the proposed Panama and Nicaragua canals, as well in the Caribbean as on the Pacific, is so close that, as a rule, no reference will be made to either canal. That a canal will be built at one or both places is regarded as a certainty, and an examination of the field that will be tributary to this new highway of the world cannot be too early made.

The present routes to the Pacific by the way of the Caribbean Sea and the isthmus from our North Atlantic ports are the well-known ones through the Windward and Mona Passages, while from the Gulf ports the track lies through the Yucatan Channel.

The steamer routes from Europe, leaving from the English Channel or the Straits of Gibraltar, go either by the way of the Azores or by Madeira ; and the sailing routes reaching still farther south join the steamer routes, both entering the Caribbean in the vicinity of St. Thomas. Guadeloupe, or Barbadoes. All of these present routes will continue to exist with little change upon the opening of the canal.

The steamer routes in the Pacific are now, coast-wise, North and South ; until, reaching San Francisco to the northward, other routes are met with extending to Oregon and Alaska, to China and Japan, and returning to the southward and westward to the Hawaiian Islands and Australia. From Valparaiso, in Chili, a southerly continuous steamer route now exists by the way of the Straits of Magellan to the east coast of South America and the European ports. Sailing routes to and from Panama in the Pacific can hardly be said to exist, so seldom are they used. Brito, however, the proposed terminus of the Nicaragua Canal, is much better placed for sailing vessels, as they emerge from the canal. The route from San Francisco to Brito alone is nearly two weeks shorter than that from Panama, and all of the sailing routes from Brito would possess decided advantages over those starting from Panama.

A new trade route from our Atlantic and Gulf coasts to China and Japan would be made possible by the

canal, with a point of call at the Hawaiian Islands ; and our vessels bound to Australia and New Zealand would then find a shorter way to these countries, calling either at Tahiti, the Marquesas Group, or Rapa Island, in the mid-Pacific.

The route to the west coast of North and South America would be made continuous both from Europe and our eastern seaboard, and our new routes to the Philippine Islands and the Dutch East Indies should find an American port of call in the mid-Pacific among the Gilbert Islands, a group which our missionaries have done so much to reclaim from barbarism.

In examining the existing trade conditions of the Pacific countries we find, in general terms, that Europe and the United States furnish about all of the trade coming from the Eastward. Europe sends almost exclusively manufactured articles, such as metals, cotton, woollen, silk and linen fabrics, and various articles of wooden and earthenware, the only raw material in bulk, worthy of note, being coal from Great Britain ; and since the rapid development of the coal-fields of British Columbia and Puget Sound, of Japan, Chili and Australia, on the shores of the Pacific, this trade has relatively declined. In addition to our manufactured articles, the United States send as raw material coal and petroleum and some lumber.

The return trade from the Pacific is almost entirely composed of raw materials, of which wheat, wood, gold, silver and copper, coffee, copra, sugar, nitrates and teas may be mentioned as the most important. In making a detailed examination of the countries that will be reached by the canal, we find in Central America, with

many of the outlets for its trade on the Pacific, a rich and diversified region, the greater portion of which is at an elevation sufficiently great to afford a climate suitable for a white population. Notwithstanding this fact the whites are in a small minority, and the resources of this region are but scantily developed, while a great portion of its export trade goes past our doors to Europe, and a still greater amount of its imports is supplied from that continent. The principal articles of export from the Central American countries are coffee, indigo, hides, india-rubber, dye and cabinet woods, sugar, cocoa, and tropical fruits. The greater part of our coffee and indigo supply should come from Central America, instead of from Brazil and the more distant East Indies.

The cultivation of tropical fruits, and especially the banana, has been greatly stimulated in the Central American countries by their nearness to the practically unlimited market of the United States. Increased facilities of communication by railway and steamer have brought these perishable fruits within the reach of the dwellers in the distant interior. The demand outruns the supply, and sections of Central America, the rivers, lagoons, harbors and railroads, are being lined with banana plantations, the existence of which depends upon the market afforded by us.

In addition to the great agricultural and pastoral resources of Central America, partly shown by the exports, there is great mineral wealth lying yet untouched within the limits of these countries. Resources of this kind exist in San Salvador, Nicaragua, and more particularly in Honduras; and their develop-

ment is not only retarded by the want of capital directly applied, but also by the want of facilities for transportation. Among these mineral resources are gold and silver, and rich deposits of iron and "brown coal."

The United States ought to supply the greater part of the articles of importation into these countries, such as the cotton, woollen, linen and silk fabrics, the provisions and petroleum, now furnished by England, Germany and France. The value of the exports from Central America is shown by recent statistics to be, in round numbers, \$21,000,000, while that of the imports amounts to \$16,000,000. Surely this trade so close to us is worth having, and the enterprise and intelligence of our merchants should now look beyond our home limits and prepare to take advantage of the cheaper transportation which the canal will afford. They should also adopt the system of long credits and the practice of careful packing, which have done so much to secure the European hold on the Central American trade.

The Pacific coast of Mexico, though so much longer in extent and so much richer in resources than its Gulf coast, furnishes, owing to its isolation and want of development, but one-sixth of the export trade of that nation. In addition to the more valuable minerals that abound along this coast and furnish twelve-thirteenths of its exports, there are resources of iron, coal, lead and tin that cannot be said to have been explored. Of other articles we need only mention the unequalled cacao of Soconusco, the famous coffee of Colima, the rice, indigo and tobacco of the Southern coast, and the salt, phosphates and orchilla of the regions about the Gulf of California. The goods wanted from the outside

world are mainly the same as those required in Central America, the trade being in both cases, to a very large extent, in the hands of Germans, who are so successful as merchants in these countries. Though the Germans are too shrewd to force German goods, exclusively, upon the people, they are ready assistants, whenever practicable, to the German manufacturer, with his cheaper and inferior goods. The preparation given the future German merchant before starting from home greatly aids his after success. Commercial schools and trade courses have been inaugurated to fit the scholars for their career in foreign lands, and of late a school of living Oriental languages has been instituted in Berlin, partly with a view to educate persons about engaging in business in Eastern countries.

The great export staples of our States and Territories of the Pacific coast are breadstuffs, particularly wheat, barley and flour. Besides these, the Pacific States ship lumber, canned salmon, ginseng, quicksilver, and gold and silver in ore and bullion. The value of one of the breadstuffs as a commercial staple can be duly appreciated when it is considered that nearly one-half of the wheat exported from the United States is supplied by the Pacific slope. The breadstuffs are sent mainly to Europe, and will go through the canal in all probability as a return cargo in freight steamers belonging to the Atlantic coast. The superiority of this improved transportation and the economy of the steamer in commerce can be better understood when it is known that the sum of all the port entries of the world shows that sailing vessels make three, and steamers fifteen voyages per annum, so that the average carrying-power of a steamer

is five times as great as that of a sailing vessel. In addition to the various staples of the Pacific slope, many of the products of the waters and islands of the Pacific will be brought together at San Francisco and sent eastward by the canal. This is already the case with the cargoes of most of the vessels engaged in the fur, seal and whale fisheries of the North Pacific. San Francisco, with its fine geographical position, magnificent harbor, excellent internal water communications, and its great railway systems, possesses obvious advantages which, combined with the intelligence, foresight and energy of its merchants, and its greater proximity to the European and Atlantic markets, must place it above all of its possible rivals in the Pacific. With direct steamer communication to and from Europe by way of the canal, will end the singular isolation and dependency which have so long retarded its advancement. The most striking effect of the opening of an inter-oceanic canal upon our trade to the west coast of South America will be the saving of the time now lost by the delay and the trans-shipment of goods at Panama. Not only will the continuous water route do away with detentions and the missing of connection at Panama, it will greatly lessen also the cost of freights and cannot fail to give us a fairer share of the commerce with Western South America. The articles of export common to the countries of this coast are gold and silver ores and bullion, cinchona or Peruvian bark, hides and coffee. With these must be mentioned the cacao and India-rubber of Colombia and Ecuador, the sugar, guano, vicuña and alpaca wools of Peru, and the nitrates, copper and breadstuffs of Chili. The canal will be the natural out-

let for almost all of these articles bound to a European or Atlantic market.

Of the manufactured products that go in return we should supply the larger share, not only in articles more peculiarly American, but in those common to Europe and America. In railway plant alone our material, which is better fitted for these countries than that made in Europe, should control the market, while in Bolivia our merchants would find a commercial field hardly explored by Americans.

Turning from the coast of South America, we find that England, France and Germany are rivalling each other in the absorption of the various groups of islands which dot this vast Pacific Ocean.

Polynesia, which has for its eastern boundary the west coast of South America, has now its western limits at the 180th meridian. In this division of the Pacific the French predominate politically, but not commercially. The first group of islands, however, that we meet with in leaving the South American coast, the Galápagos, is under the jurisdiction of Ecuador. This group contains a small and uncertain settlement of Ecuadorians, and being out of the line of the present commercial routes and with only tolerable harbors and water supply, it is at present of little trade importance. There is, however, in the interior of the islands, quite an area of good soil, capable of sustaining a considerable population, and the group, from its geographical position, may acquire a certain importance upon the opening of the canal. The other islands off the coast of South America will remain insignificant factors in the future trade of the Pacific.

The three great groups in the mid-Pacific controlled by France are the Marquesas, Paumotus, or Low Archipelago and the Society Islands; and with the last I class the outlying islands of the Austral group, and the island of Rapa, all under the control of France. The principal product of these islands, is at present, copra, or the dried kernel of the cocoanut; after this follow pearls and pearl-shell, sugar, cotton, and tropical fruits. The soil of these islands is also capable of raising coffee and tobacco, and is suitable for the pasturing of live stock. Of the products just named, the sugar and the tropical fruits will find a market in the Pacific, and will not be likely to pass through the canal. For copra and cotton there is a steady demand in Europe, but as the production of cotton is restricted by the unsettled condition of the labor question in the tropical and sub-tropical Pacific, copra would be at first the only great product passing through to the Atlantic.

The various islands to the westward of the Society Islands and the French possessions, forward their products when collected to San Francisco, Tahiti, Auckland, and Sydney; or, coming within the sphere of trade of the German South-Sea Company, they send their produce to Apia in the Samoan islands. The commercial organization known as the "German South Sea Trading and Plantation Company," is the successor of the once famous Hamburg firm of Godeffroy & Co. Its operations extend across the Pacific from the Society Islands, through the Samoan, Tongas, Gilbert, Marshall, Caroline, and other groups, until they reach New Guinea and Cochin China.

The firm of Godeffroy & Co., whose former principals

largely hold the stock of the South Sea Co., was in existence for a century. Before 1857 its operations were confined to the Indian Ocean, in the East, with Cochin China as headquarters, and in the West, to the coast of South and Central America, with Valparaiso as the central station. In 1857, a station was established in the Paumotus or Tuamotus, and operations were extended to the westward. The Samoan islands were finally made the headquarters in the Pacific. In 1872 the establishment at Apia numbered thirty-four Europeans, mostly Germans, and numerous supernumeraries of all nationalities, and occupied about 25,000 acres of land, of great fertility, obtained from the natives. This land was acquired in various ways, one method being by barter; Messrs. Godeffroy & Co. enjoying exceptional advantages during the civil wars among the natives from their control of a manufactory of firearms at Liege, Belgium, through which they could supply guns at a "cheap rate and reasonable profit," for money or for land. The natives sold freely and indiscriminately to such an extent that at the present time more land is claimed, by whites alone, than is represented by the actual area of the islands. These claims, if legalized, would leave no resting-place for the natives who still number in the whole group about 35,000 souls.

Godeffroy & Co. established at Yap, in the Caroline Islands, an intermediate station between Samoa and their old agencies in Cochin China, and acquired 3,000 acres of land. By this time the firm had an agent in every productive island of this part of the Pacific which was inhabited by natives disposed to permit white men to reside and trade among them.

Before the Franco-German war a programme of colonization was drawn up for Upolu, the most fertile island of Samoa, and a German man-of-war, the *Hertha*, was *en route* to Samoa, to prepare the way for military settlers from the home country. These plans were suddenly ended by the outbreak of the war, the recall of the *Hertha*, and the French blockade of Hamburg. The suspension of all commerce with Hamburg resulted in the failure of Godeffroy & Co., and after the return of peace, the stock and good-will of the firm were taken by the South Sea Company and, notwithstanding the fact that the company has failed to receive, so far, the direct guarantee of the Imperial Government, it has gone on with the indirect influence of the Government at its back. How actively this influence is exerted the current news of the day tells us.

The Marshall Islands have been annexed to Germany, the Caroline Islands were almost absorbed, and the Samoan islands, owing to the indifference of the English Government, not to speak of our own, are likely to be "protected" into a German colony at an early date.

Commercially, the South Sea Company has not met with the success of its predecessor, and there are English, Americans, and other German rivals now in the field. Of late years, two American firms from San Francisco, have entered into competition with the German Company, and were our trade and traders closely followed by our flag, as the German merchants are supported by Germany, the American traders, who are more popular with the natives, could maintain their trade influence and acquire a firmer foothold.

The great staples of the other islands of Polynesia,

Melanesia and Micronesia, are the same as those of the French possessions in the mid-Pacific. As we go to the westward and approach the Malaysian and Asiatic islands the soil becomes capable of growing indigo, ginger, nutmegs, and other spices, as well as various fibre-producing plants. The imports of these islands consist mainly of provisions, lumber, hardware, liquor, drygoods, and clothing, in the parts inhabited by whites; while in the partly civilized and savage islands the articles desired are tobacco, calicoes, hardware, and small pieces of wrought iron; American knives and axes having the preference.

The Fiji islands since they became, in 1874, an English colony have developed a wealth and prosperity which are more particularly due to the greatly increased cultivation of the sugar-cane. This cultivation is restricted only by the want of labor; the labor problem being the one upon the solution of which the future prosperity of all the tropical and semi-tropical Pacific islands greatly depends.

The Fijians, Tongans, Samoans and the natives of the French islands will not, as a rule, work as plantation hands, and so the white planters have been securing their laborers by various methods (even by kidnapping), from the New Hebrides, the Salmon, the Gilbert, and other islands in and about the equator. These men of low intellectual order make good laborers, but their numbers are diminishing, and their unwillingness to go to the plantations, especially to those of the French and Germans, is manifestly on the increase. To meet this difficulty, Indian and Chinese coolies have been brought into the Fijis and employed for stated terms, and with a

fair measure of success. It is among the possibilities that by these coolies or by a mixed race proceeding from them, this labor question may be solved.

If Australia be regarded as a continent, New Guinea is the largest island in the world, and its partition in 1884 between England, Holland and Germany, will doubtless lead to greater activity of trade here, and to the opening of its resources. With its large population estimated at 5,000,000, it offers a field for commercial activity, and its soil is capable of producing all the products of the South Pacific and Malaysia.

New Zealand belongs to the domain of the American canal, both with regard to the United States and Europe. It is third in trade importance of all the Australian colonies, and is peculiarly fit for colonization by whites of Anglo-Saxon origin. Being insular, with abundance of coal, great pastoral and agricultural resources, and fairly provided with good harbors, it should become, besides a wheat and wool-growing, a maritime and manufacturing country, and an important element in the commerce of the canal. Its exports, amounting to over \$35,000,000, consist mainly of wool, frozen meats, gum, flax, tallow and gold. The imports, which exceed \$37,000,000 in value, consist principally of cotton, woollen and linen fabrics, hardware, machinery, and sugar, all supplied from Europe and the United States. The Australian colonies proper will be a meeting-place for the European trade, coming by the two routes of the American and the Suez canals, with certain advantages at first in favor of the latter. With the Atlantic States, the trade to and from these colonies will go through our trans-isthmian canal, and the wool of Aus-

tralia should go to the Atlantic coast in exchange for cotton fabrics, hardware, petroleum and machinery.

The Philippine islands and the Dutch East Indies furnish us with sugar, manilla, hemp, coffee, and spices, while we send little in return but petroleum, which is meeting competition with Russian petroleum coming by the way of Suez. The question of the control of the petroleum trade of the Pacific will be fought out by the aid of the American canal, the non-existence of which now seriously handicaps our trade in this article in the Asiatic countries.

The well-known exports of China and Japan will find a new and economical route by the way of the inter-oceanic canal, and the balance of trade which is so greatly against us may be equalized by our improved facilities of interchange. In this field, as well as in the whole of the Pacific, Germany is rapidly increasing in commercial importance.

We shall close our round of the Pacific by a reference to the Hawaiian Islands. The trade of this group, though comparatively large, is almost exclusively with our Pacific States. With the opening of the Isthmus route, some direct trade may come from Europe and the Atlantic States, and the excess of the Hawaiian sugar may go through the canal, but the commerce of the islands will be almost entirely confined to the Pacific. Their importance will be increased by their position as a mid-way point of call on the routes from the canal to China and Japan, these trade routes bisecting the existing ones from San Francisco to Australia, New Zealand and the south-west Pacific.

In closing this review of the commercial field to be

affected by the successful completion of the ship canal between the two great oceans of the world, it is not difficult to see that, with its opening, a great epoch in the commercial history of the world will be begun. The importance of the work to the United States can hardly be estimated. The impetus it will give to our commercial activity can be checked only by the want of wisdom in our laws, or by a lack of the proper amount of intelligence, enterprise and capital in the country. That these abound among us the development of our wealth and prosperity at home sufficiently shows, and the opportunities in store for us upon the sea should not be lost.

GEOGRAPHICAL NOTES.

A NEW GEOGRAPHICAL SOCIETY. — The *National Geographic Society* has been incorporated at Washington, D. C., for one hundred years.

The officers elected for the year 1888 are: Gardiner G. Hubbard, President; H. G. Ogden, of the U. S. Coast and Geodetic Survey, Com. J. R. Bartlett, of the Hydrographic Office, Gen. A. W. Greely, Chief Signal-Officer, Dr. C. Hart Merriam, Department of Agriculture, and A. H. Thompson, of the U. S. Geological Survey, Vice-Presidents; C. J. Bell, Treasurer; and Henry Gannett, of the U. S. Geological Survey, and George Kennan, Secretaries; and Managers Dr. J. C. Welling, President of the Columbian University, W. B. Powell, Supt. of Schools, Washington, Capt. Rogers Birnie, Jr., U. S. A., W. D. Johnson and Marcus Baker, of the U. S. Geological Survey, Henry Mitchell, U. S. Coast and Geodetic Survey, G. Brown Goode, National Museum, and Cleveland Abbe, U. S. Signal Office.

Washington possesses great resources for the collection and dissemination of geographical intelligence, and these will, undoubtedly, be turned to account under an administration composed of men already well-known for their services to the cause of science.

WATER-SPOUTS OFF THE ATLANTIC COAST. — In a Supplement to the *Pilot Chart of the North Atlantic* for March, 1888, the U. S. Hydrographic Office shows the

position of 14 vessels, from which water-spouts were observed between January 12, and February 29, of this year.

In 11 cases the vessels were within the area enclosed by the meridian of Bermuda on the E., the U. S. coast-line on the W., Lat. 40° on the N., and the N. coast of Cuba on the S. The accompanying text of the Chart is by Mr. Everett Hayden, and is here given in a condensed form.

Water-spouts are special cases of whirlwinds. A layer of warm, moist air at the surface of the ocean may sometimes have above it a layer of cooler, drier air. Sooner or later the warm air rises through the cooler air. This process is sometimes gradual over large areas, but is, at other times, more local, and there seems to be formed in the upper layer an opening through which the lower drains upward, as through a funnel.

When there are great differences of temperature and moisture, and the supply of warm, moist air at the surface is great, the action becomes very intense, and still more so as the air rises, because the moisture is condensed and the latent heat liberated.

As the surface air escapes upward through the opening, it takes a rotary motion, the velocity of which increases towards the axis of the funnel and a partial vacuum is created, as indicated by the low reading of the barometer at the centre of a cyclone. In a great cyclone, or hurricane, the direction of rotation is determined by the revolution of the earth about its axis, and this rotation is, in the Northern Hemisphere, invariably *against*, and in the Southern *with* the hands of a watch, as you look down on it, lying face up. This law holds

good in most cases, but not always, for tornadoes and water-spouts.

When a whirlwind is thus formed over the ocean, water is often drawn up the centre of the whirl by the suction created.

When a spout is forming, the upper portion is often visible first, seeming to grow downward from the clouds. Observation with a telescope shows that the motion in the column itself is upward, though the moisture in the rising air is condensed lower and lower down, and makes the whirl appear to be actually descending.

Perhaps the most interesting cases were those reported January 26, 27, and 28 (all near together and less than 4° E. of the New Jersey coast), for the reason that they were clearly associated with a low-barometer area of considerable energy, which moved across the great lakes on the 25th, and was central off Nantucket on the 26th. It has been shown by the U. S. Signal Service that tornadoes on land take place almost invariably in the southern quadrants of an area of low barometer. The reports in the three cases mentioned seem to leave no doubt that whirlwinds and water-spouts are sometimes associated in a similar way with cyclonic storms at sea.

The American bark *Reindeer*, Capt. Strandt, was the only vessel of the 14 that received any damage. On February 11, she was in the Gulf Stream, Lat. 32° 04', Lon. 76° 06', running towards New York in squally weather, with light, southerly winds, when a water-spout dismasted her below the heads of the three lower masts. No warning was given; the weather was apparently

clear at the time, and the whole affair was over in a few minutes.

It is the intermingling of the warm, moist air that hangs over the Gulf Stream, and the cool, dry air brought from the land by the north-westerly winds that generates these dangerous whirlwinds on the ocean.

MINERAL PRODUCTS OF THE UNITED STATES, 1882-1886.—The U. S. Geological Survey has published in tabular form the amount and value of the mineral products of the country for the calendar years 1882-1886.

The totals are in value :

NON-METALLIC PRODUCTS.

1882.	1883.	1884.	1885.	1886.
\$228,410,380.	\$242,111,859.	\$220,050,674.	\$240,114,544.	\$243,963,063.

METALLIC PRODUCTS.

1882.	1883.	1884.	1885.	1886.
\$219,755,109.	\$203,128,859.	\$186,426,074.	\$181,599,365.	\$215,364,825.

UNSPECIFIED.

1882.	1883.	1884.	1885.	1886.
\$8,000,000.	\$8,000,000.	\$7,000,000.	\$7,000,000.	\$6,000,000.

The product of Bituminous coal in the five years was 333,774,573 tons, valued at \$396,560,057; that of Anthracite, 167,952,114 tons, worth \$366,955,729; that of Petroleum, 127,495,643 barrels, valued at \$109,143,395; that of Natural Gas, in value, \$16,851,350. The increase in this last product is enormous, from 1882, when the amount was \$215,000, to 1886, when it reached the figure of \$9,847,150. The value of the

Lime produced in the five years was \$100,650,000; that of the Building Stone, \$98,000,000; that of the Salt, \$22,310,826. Of Pig iron, 23,044,556 tons were produced, worth \$431,916,413; of Silver, 189,031,513 Troy ounces, worth \$244,400,000; of Gold, 7,933,010 Troy ounces, worth \$160,101,000; of Copper (including that made from imported pyrites) 688,801,422 pounds, valued at \$87,029,710; and of Lead, 1,362,788 pounds, valued at \$58,621,491. Zinc was produced to the value of about \$3,500,000; and Quicksilver to that of \$1,200,000, yearly.

THE SIZE OF IOWA.—*Trübner's Literary Record* is an authority which may generally be trusted for statements of fact; and it is with surprise that the reader comes upon the following passage in a notice of "Agriculture in the U. S. A.," in No. 236:

"There appears to be plenty of room for settlers in Iowa, as it appears that during the past five years 100,974,134 acres of land have been disposed of, equalling four states as large as Indiana, or three-fourths of Germany." 100,974,134 acres are equal to 157,772 square miles. Iowa contains, according to the census of 1880, 55,475 square miles, and Indiana 35,910; while the area of the German Empire is 211,196 square miles.

The *Record* seems to have taken too literally the ample phrase, which it quotes from the report of the Iowa State Agricultural Society:

"Nature (in Iowa), is large, bountiful, leaving nothing lacking, having nothing undesirable."

A State so blest should have and dispose of any possible number of acres.

CLIMATOLOGICAL DICTIONARY.—Mr. L. Cruls, the distinguished Director of the Imperial Observatory at Rio de Janeiro, has undertaken the task of preparing a Universal Climatological Dictionary, to be printed under the auspices and at the expense of the Observatory.

The director asks the co-operation of Observatories and Meteorological Institutions throughout the world and furnishes a printed form to be filled out and transmitted to the Imperial Observatory.

This form is to give :

Place of Observation (in Province, State or Country.)

Longitude (E. or W. of Greenwich), and Latitude.

Number of Years of Observation.

Height above Sea-Level (in Metres or Feet.)

Temperature :—(Centigrade or Fahrenheit.)—

Mean for each month and each year.

Highest, monthly, each month and each year.

Lowest, “ “ “ “ “ “

Humidity, “ “ “ “ “

Cloudiness, “ “ “ “ “

(0=perfectly clear sky ; 10=entirely covered.)

Rainy days for each month and each year.

(*Rain* includes snow, fog, dew, etc.)

Rainfall (in millimetres or inches), for each month and each year.

Stormy days for each month and each year.

Days of frost, “ “ “ “ “

Prevailing winds, “ “ “ “

Absolute highest temperature—date.

Absolute lowest temperature, “

(Centigrade or Fahrenheit.)

Mean annual barometer (in millimetres or inches.)

Mean annual variation of the barometer, (in millimetres or inches.)

Add the name of the Institution on which the station depends, as—"Signal Service, U. S. Army, Washington, Chief Signal Officer, A. W. Greely."

THE MOTION OF AN EARTH-PARTICLE DURING AN EARTHQUAKE.—Prof. Seikei Sekiya gives in the *Transactions of the Seismological Society of Japan*, Vol. XI, an illustration here reproduced, of a diagram delineating the motion of the earthquake which occurred in Japan, on the 15th of January, 1887, as traced on the plate at Tokio.

The shock began about thirty-five miles S. W. of Tokio, and the waves were propagated nearly two hundred miles to the west and north-east along the Pacific seaboard, and on the north-west nearly to the shore of the Japan Sea. The area affected covered about 32,000 square miles.

The explanation of the figures is :

The model is made in three parts, each showing the motion for twenty seconds, or so ; thus Fig. 1 indicates the motion from the beginning of the shock to the end of the twentieth second, Fig. 2 from the latter instant to the end of the fortieth second, and Fig. 3 thence to the end of the seventy-second second. At that point the vertical motion practically ceased.

The earthquake begins with short period tremors. During the third second there appears a vigorous horizontal motion, N. W. and S. E. (at right angles to the line joining the origin of the disturbance and the instrument) accompanied by a vertical displacement. Both

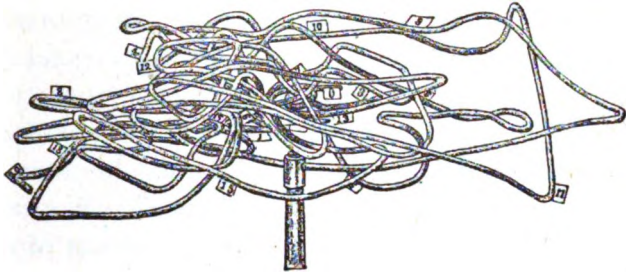


Fig. 1

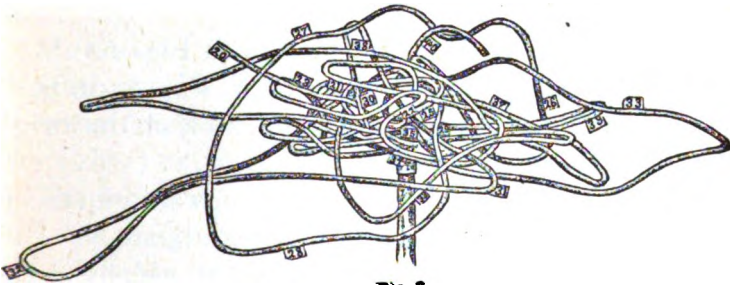


Fig. 2

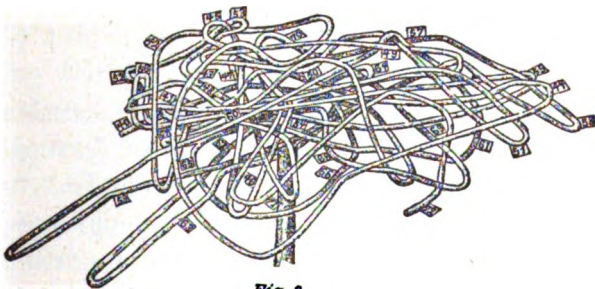


Fig. 3.

THE MOTION OF AN EARTH-PARTICLE DURING AN EARTHQUAKE.

horizontal and vertical motions then continue with great activity. At the ninth second (and again at the tenth), is recorded a vertical motion of $\frac{1}{20}$ ", the largest during the shock, and synchronously with it a horizontal motion of $\frac{1}{5}$ " N. W. and S. E., the complete period of oscillation in both being 1.5 seconds. Vertical motions are most marked during the first part of the disturbance.

The maximum horizontal displacement of nearly $\frac{1}{4}$ " occurs from the thirty-third to the thirty-fourth second with the complete period of two seconds. The direction is then nearly W. S. W. and E. N. E., or in a line with the origin of the shock.

Few up-and-down oscillations occur in Fig. 2.

The principal horizontal motions in Fig. 3 run S. E. and N. W., or transverse to the direction of the origin of the disturbance.

In this Figure several outbursts of upward movement are observed, with inert intervals between them.

In earthquakes the vertical movement usually ceases long before the horizontal. When large vertical motion occurs, there is usually simultaneous large horizontal displacement; but the latter may be recorded without the former.

THE NAMING OF PLACES.—The Queensland Branch of the Royal Geographical Society of Australia adopted in October last the following resolution: "That the Queensland Branch of the Royal Geographical Society of Australia views with disfavor the tendency exhibited by some recent explorers in New Guinea, in naming their discoveries, to disregard the native names of the most prominent physical features of the country; that it is

expedient to discourage this growing tendency, and also, in so far as practicable, to preserve the native place-names ; and that all Geographical Societies be invited to co-operate by an expression of opinion."

The expression is sure to be received as information, and laid upon the table, for explorers will follow their own sweet will. They should, nevertheless, be told by all, who can speak with authority, that not to learn and respect and report the native names of places and points and natural features, is to fail in one of their chief duties, and to merit reprobation rather than praise.

MORTALITY ON THE CONGO.—*Le Mouvement Géographique*, of March 11, publishes the official list of the persons (mostly European) engaged in the service of the Congo enterprise from 1879 to December 1887.

The whole number is 427. Of these 189 were Belgians, 89 Englishmen, 50 Swedes, 46 Germans and 15 Danes. No other nationality had a representation of 10 ; and there were but 5 Americans. There were, in all, 64 deaths ; 15 by accident, and 49 by disease. Of the 49, 37 were cases of fever, the rest of dysentery, congestion and other troubles. The highest mortality was among the English. The Belgians lost 27, the English 19, the Swedes 9, the Germans 3. There was no death among the 15 Danes, the 9 Frenchmen and the 5 Americans. The greatest proportion of deaths occurred in the years 1883-1885, the period of the greatest toils and difficulties.

There is every reason to believe that the death-rate will be reduced with the improvement of the organization of the Free State and the multiplication of comforts.

BURMA.—The *Scottish Geographical Magazine*, for February, has an excellent article on this subject by the late Chief Commissioner of the province, Sir Charles Bernard, K. C. S. I.

Burma extends about 1100 miles from north to south, and 600 miles from China, on the east, to the Bay of Bengal, on the west. It has an area of 280,000 square miles, and is, therefore, much the largest province of the Indian Empire.

The surface is, for the most part, hilly and broken, the level, cultivable land being estimated at barely 50,000 square miles, comprised in the deltas of the Irrawaddy and the other rivers. On the northern boundary are the Patkoi and other mountain ranges, said to be at one point nearly 12,000 feet high; and an immense mountain mass in the north-east divides the province from China. The Shan States form an upland region, cut here and there by deep clefts through which flow the rivers; and buttresses of the Shan mountains come close to the Irrawaddy at Mandalay and the ruby mines further north. These mines are on a plateau 4000 or 5000 feet above the sea.

The rivers are numerous. The Irrawaddy, 11,000 miles long, is navigable by big river steamers for 700 miles, and there are hundreds of miles of cross channels. The Chindwin, 500 miles long, can be navigated for 150 miles all the year, and twice that distance in the rainy season. The other streams have no great depth of water, except in time of flood—about five months of the year.

The extreme rise observed in the Irrawaddy is 44 feet; the average in ordinary years being 35 or 36 feet;

and the river in flood frequently spreads over a breadth of 20 to 25 miles. In the delta the houses are built on piles, and every house is provided with a boat. As the water rises the people retreat to the upper floors, and if a child tumbles into the water, it is fished out, for young and old swim like ducks.

The average yearly rainfall on the coast is 200 inches. At Bassein, Rangoon and other inland places, it amounts to 100 inches, and decreases rapidly to about 35 inches further up the valley. It is again heavier at Mandalay, and still heavier at Bhamo, and at the base of the Shan hills.

Lower Burma has all been surveyed topographically. Something has been done in Upper Burma, but the regular survey is yet to be made.

The relations with Siam and China are friendly.

The Shan States number about 60, large and small, always more or less hostile among themselves. The whole Shan population is about 2,000,000, and some of the larger chiefs have already acknowledged the British supremacy. The policy of the Indian Government is to strengthen the larger States and make them responsible for keeping the peace and protecting the communications.

Sir Charles Bernard estimates the whole population of Burma at a little over 9,000,000, the Burmese proper numbering $5\frac{1}{2}$ millions. He thinks highly of the Burmese. They are manly, cheerful, and courageous, and fairly industrious. They are more generally educated than the Indians; more so, even, than the people of some Northern European countries.

The Burmese women lead a happier life than those of

India. They come out, mix in society, do the marketing, keep shops, and generally share in domestic and social concerns quite as much as Scottish women. They settle their own love affairs, and a Burmese widow can marry again as soon as she gets a chance.

There are in Burma no very rich people, no large landlords, no nobility ; and the only aristocracy is the official one. The general prosperity is great, and the people spend their money freely. Wages are four times as high as in India.

The most respected and influential persons are the Buddhist monks who number about 6,000 in Lower, and perhaps 20,000 in Upper Burma. For the most part, they observe their vows of celibacy and poverty very strictly. If for any reason they desire to return to the world, they are free to throw off the monk's robe, and take up the ordinary duties and pleasures of life. They own no property, and enjoy no endowments, but are supported by their parishioners.

Like the Burmese, the Shans are Buddhists. They are poorer than the Burmese and hardier, and they are wonderfully apt traders and pedlars.

The Karens live in Lower Burma. They are agriculturists, and they make steady and capable artizans. They were formerly nature-worshippers, but have been converted by the American Baptist missionaries, and now maintain out of their own resources as many as 600 parishes. Little is known of the other hill-tribes.

The one product of Lower Burma is rice. Upper Burma produces, besides rice, wheat and pulse, and a great deal of cotton, which is exported to China. The vast forests, now under careful supervision, yield teak.

cutch gum, india-rubber and wild tea, which is used, not for drink, but as a pickle. The monopoly of this pickle brought to King Thebaw's revenue £80,000 a year. Among the minerals of Upper Burma are iron, copper, lead, gold, silver, marble, coal, jade and rubies. It will not pay to work the iron, copper and lead; and the gold and silver do not amount to much. The coal is likely to be important. There are three coal-fields; one close to the railway (from Rangoon), another on the Irrawaddy, half-way from Mandalay to Bhamo, and the third on the Chindwin.

The marble is used for statues of Buddha and for the pagodas. The Burmese mines supply all the jade used in China and Japan, and the Chinese who control the product pay what looks like a trivial royalty of £5,000 a year for the quantity they export.

The Burmese rubies are the finest in the world. The district which produces them covers nearly 200 square miles, and the demand for precious stones being, like human vanity, a constant quantity, there should be a boundless market for these gems.

The Burmese petroleum may some day become valuable, but for the present the American article supplies the demand.

EXPLORATIONS IN BRITISH NORTH BORNEO.—Mr. D. D. Daly, Assistant Resident in charge of Province Dent, gives, in the Proceedings of the Royal Geographical Society for January, an account of his five years' observations. Dent Province occupies the south-western portion of British North Borneo, and presents a nearly blank surface on the map.

The Colony contains 31,000 square miles, with a seaboard of 700 miles, and a total population of 150,000.

The principal land-locked harbors are Gaya, on the west, Kudat, on the north, and Sandakan, the headquarters of the Government, on the east coast.

Besides Dent Province, the divisions are: Keppel Province on the north-west, Alcock Province on the north-east, and the East Coast Residency on the south-east.

Mr. Daly entered the interior from the eastern side by the Kinabatangan River. The first place of importance reached was Malapi, the depot for the edible birds'-nests. These nests are gathered from the Gomanton Caves, about twelve miles north of Malapi. The height of one vault in these caves has been estimated at 900 feet, and some idea of the numbers of the swifts (*Collocalia*) may be formed when it is said that a steady column has been timed by watch to fly for three-quarters of an hour from one of the apertures. The birds'-nests are formed of the inspissated saliva of the birds. The yearly product of the caves is valued at \$25,000, and the North Borneo Government let them in 1884 for \$9,000 a year. There are many similar caves along the river.

The land was everywhere rich, and suited to the cultivation of sugar and the sago palm. The latter, the chief product of the west coast, has but lately been introduced in the east.

At the Obang-Obang Mountain, at the head of the Melikop, one of the branches of the Kinabatangan River, Mr. Daly obtained a grand view of the Kinabalu range, which rises to the height of 13,698 feet. The orang-utans abound in this region, and their red-

haired skins are made into war-cloaks by the Tungaras. These people had not yet learned the use of guns.

On the Padas River, which empties into the sea on the west coast, there were vast sago plantations and rice-fields. The sago is the pith of the tree, which is cut down when eight or ten years old and split open lengthwise. The pith is chopped out with bamboo scoops, passed through a sieve, and dried in the sun, and so becomes the sago of commerce. As fast as the palms are cut down fresh suckers spring up, so that the plantation renews itself.

The summits of the western ranges are very narrow and precipitous, and many land-slips, caused by the beating of the south-west monsoons on the sandstone formation, are visible from the sea.

On the Pagalan River, a Murut chief placed his house at the disposal of Mr. Daly's party. The house was very clean, but there were fifty-two human heads and numbers of human bones hanging from the rafters. Mr. Daly asked the chief to remove these ghastly ornaments. This request was cheerfully granted, with a certain air of pity for the white man's squeamishness. Some of the Murut tribes have given up the practice of head-hunting, but others, far removed from contact with the English, still maintain it.

The people were found to be friendly and, on the whole, fairly industrious. They are very superstitious, and pay great attention to omens, such as the flight of birds, the starting of a deer, and the like.

In all the rivers, crocodiles are numerous. Mr. Daly saw one captured and towed to the bank. It was fourteen feet long, and there was joy over it, for it had eaten

one of the chief's brothers-in-law. A chief, with his many wives, is generally well supplied with brothers-in-law, and is bound to contribute to their support; and Mr. Daly is led to believe that a Murut does not look upon a crocodile with a wholly malevolent eye.

At Api, on the Padas River, a conference took place and a treaty of peace was signed, in Mr. Daly's presence, between the Muruts and their ancient enemies, the Peluans, both tribes recognizing the authority of the North Borneo Government.

The form of oath, taken by each chief on this occasion, is equally precise and comprehensive, and might be copied with advantage in the practice of more civilized nations.

Each + denotes a chop at a stick:

"I follow the authority of the Government of the British North Borneo Company +. The Sandëwar + and the Peluan + people are now of one mind +. If I kill a Sandëwar (or Peluan) man + when I go to the water may I not be able to drink + when I go to the jungle may I not be able to eat + may my father die + may my mother die + may my wife die + may my children die + may my house be burned down + may the padi not grow in my fields + may a crocodile swallow me + may the eggs never be hatched in my fowl-house + may I never catch a fish when I go fishing + may my life be ended + I cut this stick + as if I was chopping my own head off + the Great Spirit is my witness + may this stick grow into life again + if ever I kill or take any more heads + and I follow all the customs of the British North Borneo Company + and I take this oath with a

sincere heart + and I shall pay the poll-tax of the Company +."

THE POPULATION OF CHINA. — The *Journal of the Statistical Society* for December, 1887, gives from various sources, English, Chinese and Russian, some interesting facts concerning the census methods and the population of China. The census law forms a part of the military administration, under the particular heading: "A Law for searching out Traitors and Spies." In every city, town, village and hamlet it is provided that for every ten families there shall be a tablet on which are to be written the names and number of the inhabitants. Ten families make a *chia*, and an elder is in charge of these. A bailiff, or *pau chia*, is set over every ten elderships. A registration form is filled with the name of each householder, and the number of persons in his family. The bailiff is expected to know the movements of every one in the district, whether at home or abroad, when he leaves home and when he returns, what he is doing, and the like. Inn-keepers and heads of monasteries are required to keep books of registration, and to enter therein the name and occupation of each traveller or visitor.

Every year the number of inhabitants in each place must be reported to the Board of Revenue.

According to a tabular statement published by the Board, the population of the Empire (exclusive of five provinces, from which returns had not been received,) was, in 1885, 319,383,500. The estimated population of the five provinces omitted was 60,000,000.

A table drawn up by the Russian statistician, Mr.

Popoff, from official documents brought down to the year 1879, for eight of the provinces, and to 1882 for the other ten (Shing-King is omitted), shows a total of 382,078,860. In 1842 the population numbered 413,021,452.

The most populous of all the provinces is Sze-chuen, with 67,712,897 in Mr. Popoff's table, for 1882, and 71,073,730 in 1885, according to the Board of Revenue.

After making every allowance for the disturbed condition of China in the period between the years 1842 and 1882, and for the destruction caused by the Tæping rebellion, it is still not easy to accept the official figures, as tabulated by Mr. Popoff. The province of Sze-chuen, for instance, is credited with a gain in the forty years of 45,455,933. Kuang-tung, which was almost on a level with Sze-chuen in 1842, made a gain in the forty years of but 8,553,646. The next highest gain is 6,717,958 in Shan-tung. Yunnan follows with an increase of 5,897,906, and after it comes Hoo-pi, with 4,780,441.

Three provinces, Kiang-su, Che-Kiang and Chih-li, lose more than 18,000,000 each. An-hwei loses 16,000,000, and Kan-su more than 14,000,000.

Sze-chuen increased in the forty years 200 per cent., Kuang-tung 40 per cent., Shan-tung 23, Yun-nan 100. Hoo-pi less than 17 per cent.

Kiang-su lost 48 per cent., Che-Kiang 62, Chih-li 49. An-hwei 43, and Kan-su more than 72 per cent.

GEOLOGICAL SURVEY OF NEW JERSEY.—The report of Prof. Geo. H. Cook, State Geologist, for the year 1887, is accompanied by an excellent map of the whole State.

on a scale of 5 miles to an inch. A hypsometrical map, on the same scale, will complete the Topographical Atlas of New Jersey, undertaken by the Geological Survey, in 1877, and carried through at a total cost of \$59,892.95, divided equally between the State and the Federal Government.

The Report closes with a tabular statement of the Iron and Zinc production for a number of years. The iron, estimated at 10,000 tons in 1790, reached, in 1870, 362,636, and in 1882, 932,762 tons, the highest figure yet attained. The production, in 1887, was 547,889 tons.

In the Zinc table there are several breaks, but the numbers are consecutive from 1878 to 1887, and show an average annual product of a little over 38,000 tons.

Discovery of America by Northmen.—Address at the Unveiling of the Statue of Leif Eriksen, Delivered in Faneuil Hall, Oct. 29, 1887, by Eben Norton Horsford. Boston and New York, 1888.

Prof. Horsford says, in his Preface: "I have attempted to present in the address the essential story of the discovery of America by the Northmen, omitting only the matters which properly enough may appear in an account of the life and usages of the people, but which do not so immediately concern the strict history of the Discovery of America."

The attempt is in every way successful, nor can it be believed that the story is to be found elsewhere in a form equally concise and full, and pervaded, at the same time, by a spirit at once so critical and so respectful towards the facts of history.

Certainty, with regard to the landing-place of the Northmen, is not to be hoped for; but Prof. Horsford, basing his argument on a fair interpretation of the records and a comparison of the physical conditions, has brought Leif Eriksen to the coast of Massachusetts as, beyond any reasonable doubt, the true Vinland.

The preparation of this volume, with its admirable illustrations and maps, many of them facsimiles, must have been a labor of love; and a more beautiful book it would be difficult to find.

The Final Results of the Triangulation of the New York State Survey, Together with a Description of the Methods Employed. Also, the Eleventh Annual Report of the Commissioners of the State Survey. Transmitted to the Legislature, March 22, 1887.

Albany, N. Y.: 1887.

The Report of the Commissioners briefly recounts the facts which brought about the representations made by the American Geographical Society, in 1875, and the consequent passage of the Act of April 29, 1876, for "making an accurate trigonometric and topographical survey of the State."

The primary triangulation is now completed for about two-thirds of the State. But little was added to the original appropriation of twenty thousand dollars, and it is at a trifling cost that the work has been performed which Major Powell, Director of the United States Geological Survey, declares to be excellent and admirable.

The Commissioners unanimously recommend the continuance of the survey under the supervision of a commission of five members, who shall serve without com-

pensation, and shall avail themselves, as far as practicable, of the assistance of the United States Coast and Geodetic Survey and the United States Geological Survey. The Director of the latter has proposed that the total cost of the work be divided between the State and the U. S. Geological Survey, an arrangement equally advantageous to both parties, since the triangulation already performed by the State Survey will facilitate and simplify the work on the Topographical Atlas of the country, so far as New York is concerned.

Besides the maps and illustrations in the text and appendices, the volume gives the following :

Map No. 1. Triangulation in Eastern and Central New York.

Map No. 2. Primary Triangulation in the State of New York.

Map No. 3. Triangulation of the Hudson River to Albany.

Map No. 4. Triangulation of the Hudson River, Albany to New Baltimore.

Map No. 5. Triangulation of the Hudson River, New Baltimore to Hudson.

The English in the West Indies, or, The Bow of Ulysses.—By James Anthony Froude.

New York, 1888.

Mr. Froude's book is partly a political pamphlet and partly notes of travel. The fitness of the sub-title may be clear to the author's mind ; to the reader it is more than dim. The motto from Goethe is, on the contrary, significant, for it warns every one, at the outset, that

Mr. Froude looks on those who do not agree with him as enthusiasts, given to making and believing a lie.

The West Indies show, as in a mirror, the demoralized condition to which Ireland will be reduced if Home Rule prevails. This is the burden of Mr. Froude's political song. The islands are ruined, the blacks are making no advances in civilization, and the English power is merely a name.

Salvation lies in ruling the West Indies on the Indian system, that is, by the sword. The obvious difficulty in the case does not seem to disturb Mr. Froude. The blacks of the English West Indies are not a conquered people. They are free men, and most of them were born free, under the English flag. Legally, they are Englishmen. How is England to apply to such a people the military system by which she retains her hold on India? She cannot do it; but she must, according to Mr. Froude, or the blacks will continue to play at Home Rule and go to perdition, and the Irish will follow them, for the modern world is given up to the base instincts of Democracy, and the men that talk have taken the place of the men of action. This deplorable state of things is largely the work of orators, says Mr. Froude, and for the orators, from Demosthenes to Gladstone, he entertains very little respect; which seems to be a pity.

Even with Home Rule, however, the black "brothers-in-law" are declared to be the "most perfectly contented specimens of the human race to be found upon the planet." They are fast travelling, however, towards the savagery and cannibalism of Hayti, and nothing saves them, for the moment, but the presence of the English. This once withdrawn, chaos will come again.

Hayti itself Mr. Froude just looked at; but he had read Spencer St. John's book, and all that he could learn in the West Indies went to confirm Sir Spencer's disheartening statements.

Mr. Froude's own studies of the negro in Barbadoes, and Jamaica, and Trinidad are interesting and instructive. He has an eye for character and there is no gain-saying some of his conclusions. When he is willing to forget the bad example of Demosthenes and Gladstone, and is content to tell us what he saw, he is very entertaining. He has a great admiration for the men of the sixteenth century, and the laurels of Drake will not allow him to observe the proprieties. The sight of an English man-of-war on the way to Venezuela suggests to him what a good thing it would be to "pull Guzman's nose"; Guzman being Guzman Blanco, the President of Venezuela. When Drake said he would singe the Spanish King's beard, he was disrespectful to the mightiest monarch then living; but he was a man of action, and he went in person to do the singeing. Guzman Blanco is not Philip II., and Mr. Froude resembles Drake, with a difference.

The charm of his style and his evident sincerity may atone for some of Mr. Froude's shortcomings, but they do not always cover his inaccuracy.

In order to clinch an argument, he says that Spanish sugar goes free into the American market; but no one in the United States is aware of the fact.

On p. 340 we are told that "St. Domingo, or Española, of which Hayti is the largest division, was the earliest island discovered by Columbus, and the finest in the Caribbean Ocean."

Guanahani, the first island discovered by Columbus, and by him named San Salvador, has not been identified, but it was certainly not St. Domingo ; neither is Hayti the larger of the two republics in the island. Santo Domingo, the eastern division, has an area of about 20,000 square miles, and that of Hayti, the western division, is nearly 10,000.

For a scholar who was able to misinterpret with success so many of the documents in the Archives of Simancas, Mr. Froude is strangely weak in Spanish. He does not believe that the name Barbadoes is derived from the Spanish word, *Barbados*, which means simply *bearded*, and requires the addition of a substantive in order to make sense ; and it never occurs to him that there may be a Spanish noun, *barbado*. There is still some doubt as to the origin of the name, but the probabilities are in favor of the derivation given by Delitsch : " Barbados, so called from a tree (*Ficus barbata*) which sends down from its branches tufted shoots that take root ;" and the Spanish word *barbados* has, among its meanings, one which agrees fairly well with Delitsch's description : " The offshoots of a tree, which grow around it."

The word *morro*, which means a rounded hill, or eminence, Mr. Froude persistently spells *moro* ; as if a man were to write the *below* for the *bellow* of a bull.

Columbus masquerades, in a costume half-French, half-Spanish, as Christophe Colon ; and M. de Lesseps would hardly recognize his own great work under the name of the Darien Canal.

The book is brought out in handsome style, and the illustrations, from sketches by the author, are very good.

Haïti en 1886, par Paul Deléage.

Paris, 1887.

M. Deléage has much to say of Gen. Salomon's virtues—not the least of these being his marriage to a French wife—of the Haytian Bank, and of the polished tone that prevails in the debates of the Haytian Parliament; but in all his 400 pages there is nothing that throws light on the actual condition of Hayti; and his statistics can hardly be trusted.

The chief product of the republic is coffee, and we are told that 75,000,000 lbs. were exported in 1886, out of a crop of 100,000,000 lbs. Van Delden Laërne thinks the whole Haytian crop is below 60,000,000 lbs.

The *Almanach de Gotha* and the *Statesman's Year-Book* both put the exports of coffee for 1886 at 58,000,000 lbs.; and it may be doubted whether the available crop much exceeded this figure.

M. Deléage foresees a great future for the Haytians, who hold in their hands, he says, the keys of the Panama Canal.

This wholly unexpected revelation certainly relieves M. de Lesseps of some responsibility, and, at the same time, explains in a measure his present purpose of providing the Canal with locks; but why the keys should have been entrusted to the Haytians rather than to the Cubans, or the Jamaicans, there is nothing to show.

Like many travelled Frenchmen, M. Deléage is fond of using what he takes to be English words.

• He landed, of course, upon a *warf*, and rode to his hotel in a *buss*. He found the people refreshing themselves with *cok's talls*, and he was, perhaps, under the influence of this pernicious beverage when he began his

seventh chapter with a quotation from "the Greek poet," Thucydides.

L'Inde Anglaise, Son État Actuel, Son Avenir. Précédée d'une Introduction sur l'Angleterre et la Russie par J. Barthélemy-Saint Hilaire.

Paris, 1887.

M. Barthélemy-Saint Hilaire does not concern himself with the origin of England's rule in India. He studies her work in the peninsula and her relations to its many different races, and he is brought to the conclusion that she deserves well of the world for the manner in which she meets her responsibilities. "Since the rebellion of 1857," he says, "England has undertaken and has unremittingly pursued the education of India, with a steadiness and a wisdom that call for full recognition * * *"

What is to be the outcome of this prodigious undertaking? How long a time, how many centuries, indeed, will it require for its accomplishment?

All that we can hope for is that England, so deeply impressed with the seriousness of her task, may not be disturbed in her equally worthy and gigantic enterprise, nor forced to abandon it by any complications of external policy. There is nothing to indicate that any one of the great nations could take her place to advantage, and continue to render to India the services now performed by this unhopd-for guardianship."

Duties of a like nature with those of England in India devolve upon the other European Powers in their colonies and protectorates, and the result of their combined action will be, M. Barthélemy-Saint-Hilaire considers, the ultimate, if remote, triumph of Christianity

throughout the world. He calls attention to the uninterrupted expansion of Christian dominion during the past four centuries, and to the steadiness with which the forces represented by Christianity press against the two or three bulwarks—China, India, Africa—which still resist.

To this practical statesman and accomplished scholar the work of Russia is not less important than that of England, and he looks forward to the apparently inevitable conflict between these Powers as to a calamity.

He does not agree with those who profess to discover symptoms of disintegration in the Russian Empire. He believes, on the contrary, that Russia possesses remarkable cohesive force and a national vitality equal to any strain.

Were the Toltecs an Historic Nationality? By Daniel G. Brinton, M. D. Philadelphia, 1887.

In this paper, read before the American Philosophical Society, Sept. 2, 1887, and now issued in pamphlet form, Dr. Brinton makes short work of the Toltec myth. He first restates the current opinion, as found in the works of most reputable writers, and then gives his own in the following words:

Tula was merely one of the towns built and occupied by that tribe of the Nahuas known as *Azteca* or *Mexica*, whose tribal god was Huitzilopochtli, and who finally settled at Mexico-Tenochtitlan (the present city of Mexico); its inhabitants were called Toltecs, but there was never any such distinct tribe or nationality; they were merely the ancestors of this branch of the Azteca, and when Tula was destroyed by civil and foreign wars,

these survivors removed to the valley of Mexico, and became merged with their kindred; they enjoyed no supremacy, either in power or in the arts; and the Toltec "empire" is a baseless fable.

What gave them their singular fame in later legend was partly the tendency of the human mind to glorify the "good old times" and to merge ancestors into divinities, and especially the significance of the name Tula, "the Place of the Sun," leading to the confounding and identification of a half-forgotten legend with the ever-living light-and-darkness myth of the gods Quetzalcoatl and Tezcatlipoca."

The legend relates that the Azteca, or Mexica, —names applied to the same tribe,—after living for some generations in harmony, fell out and separated, at a time somewhere between the eighth and the eleventh centuries of our era. Dr. Brinton understands this to have been the separation of two "totems."

The followers of the tribal goddess Malinalxochitl entered at once the Valley of Mexico, while the followers of Huitzilopochtli passed on to the plain of Tula, and settled on the Coatepetl (the Serpent Mount or Snake-Hill), the central figure in all the wonderful stories about the Toltecs. Here they built houses and a temple to their god; and, after an indeterminate time, driven out by civil strife and war-like neighbors, they abandoned Tula and journeyed into the Valley of Mexico, there to found the famous city of that name.

The plain meaning of the narrative is, according to Dr. Brinton, that Tula was merely one of the stations occupied by the Aztecs in their migration, and that a

sound historical method can have nothing to do with Quetzalcoatl and the refined Toltecs.

To many sensitive souls this will be little less than flat burglary; but there is no help for it. Dr. Brinton is not the first and he will not be the last Americanist to shake his head at the Toltecs.

A Brief Narrative of the Journeys of David Thompson in North-Western America. By J. B. Tyrrell, Toronto, 1888.

David Thompson entered the service of the Hudson Bay Company in 1789, when he was 19 years old, and travelled over the great northern wilderness till 1814. For ten years after he was engaged on the Survey of the boundary between Canada and the United States, and in later life made special surveys in Canada. He died at Montreal, in extreme poverty, at the age of 87.

Some of his field books and journals are preserved in the office of the Crown Land Department of Ontario, and from these Mr. Tyrrell gives a list of 82 positions determined in the region between the extremes of 90° and 117° W. Long. and N. Lat. 45° to 58°. The extracts from the journal afford glimpses of a strange existence, that has passed away with the system under which it was developed.

TITLES OF PAPERS IN GEOGRAPHICAL JOURNALS.

AARAU.—*Fernschau. Zweiter Band.*

Explorations in Central South America—Old Pottery of the Half-breed Indians of Paraguay—The Colonial Territories of Spain as Objective Points of Travel for Commercial Youth—

Aburi and Life on the Gold Coast—Terra Cotta Pottery in Roman Switzerland—Traditional Types of the House Ethnologically Studied—The Federal Initiative in the Matter Of a Central-European Customs-Union—The Photographic Museum of the Central-Swiss Commercial-Geographical Society at Aarau—On the Value of Decorative Style in Packing Goods for Market—On the So-called Universal Language, "Volapük."

BERLIN.—*Gesellschaft für Erdkunde: Zeitschrift.*

Studies of Columbus—Remarks on my Map of the Western Sûs, Nûn, and Tekena Region (by Quedenfeldt)—Dr. Karl Passavant (Memoir)—Maori Population in New Zealand, from the Census of 1886—The Sierra Nevada de Santa Marta and the Sierra de Perijá (Venezuela)—Some Myths of the Thlinkit—Adjabia and Henia (Tripoli).

Verhandlungen.

Navigation of the Kuango as far as the Kingunji Rapids, undertaken by Dr. Mense, in company with the Rev. R. Grenfell—Wissmann's Journey in Central Africa—Report on a Reconnoissance in the Peloponnesus—Dr. Meyer on His Ascent of Kilimanjaro—The Island of Fernando Po—Dr. Luschan's Travels in Asia Minor.

Deutsche Kolonialzeitung.

African Jurisprudence—The Gold Fields in Northern Matebele—England and Germany in East Africa—The Higher Schools of South Brazil—

England and South Africa—From German East Africa—Communications from the German E. African Plantation Company—German Vitu-land—Kaiser Wilhelmsland—Germans and Italians in South America—Prospects of Tropical Tobacco Culture—The Extra-European German Press—The Occupation of Quiloa by the Portuguese, 1500–1502—The Imperial Subvention to the Mail Steamers for E. Africa—The Plantation of Kibueni (on Zanzibar Island)—Leave off Corrupting your Tongue!—Pictures of Zanzibar—The Water Question in South-west Africa—The Royal Festival at Leulumoengo (Samoa)—The Portuguese Viceroy Francisco d'Almeida and the Augsburg Merchants Balthasar Sprenger and Hans Mayr in 1505 in Kiloa—Pictures from Zanzibar—Colonial Political Sketches—East Africa—Land and People in Kiloa in 1505—Gold in South-west Africa.

BORDEAUX. — *Société de Géographie Commerciale, Bulletin.*

Expedition to Beledugu (in the French Sudan)—Voyage of the Gunboat *Niger* to Timbuktu, in 1887—Three Journeys of a Parisian Woman (Mme. de Ujfalvy) in Central Asia—The Delimitation of Portuguese Guinea—Cod-Fishery in Senegal.

BREMEN. — *Deutsche Geographische Blätter.*

The Planting of the Black Forest, and the Relations of its Forestry to Agriculture, Commerce and Industry—The Bourtange Moor (on the

Dutch-Hanoverian Frontier)—The Extension of Geographical Instruction to the Upper Classes in the Higher Institutes—Peary's Sledge-Journey on the Greenland Inland Ice, in 1886.

BRUSSELS.—*Société Royale Belge de Géographie: Bulletin.*

Notes on some Communes of Hainaut—Tombamba, an ancient City of the Incas—Iron on the Congo.

Le Mouvement Géographique.

Exploration of the Ubangi—The Railway Expedition—The British East African Association—Tobacco on the Congo—The Stanley Expedition to the Succor of Emin Pasha—The Country of the Garenganzé—The Nicaragua Canal—The French at Timbuku—The Problem of the Muta-Nzige—Lt. Wissmann's Observations in the Kassai Basin—The climate of the Kassai Basin—Rouvier's Maps of the Congo and the Kwilu—Decree Concerning the Traffic in Ardent Spirits on the Upper Congo—The Congo State and the Native Chiefs—The Flotilla on the Upper Congo—Exploration of the Chiloango and the Lukula—The Congo Company's Expeditions for Commercial and Industrial Aims—Manners and Customs.

BUENOS AIRES.—*Instituto Geográfico Argentino, Boletín.*

Exploration of the Rivers Gallegos, Colle, and Santa Cruz and the Channels of the Pacific, in Southern Patagonia.

COPENHAGEN.—*Geografisk Tidsskrift.*

The Danish Expedition to Northern Greenland in 1886-87—Maigaard's Report of the Expedition under command of Civil Engineer R. E. Peary to the Greenland Inland Ice—Some Observations on the Inhabitants of East Greenland—On The Changes in the Forests of Denmark—Where is Columbus buried ?

EDINBURGH.—*Scottish Geographical Magazine.*

On the Height of the Land and the Depth of the Ocean—The Welle Problem—Burma : The New British Province—Across China ; from Bhamô to Shanghai—Pulo Condore—A Criticism of the Theory of Subsidence as Affecting Coral Reefs—New Guinea ; Attempted Ascent of Mt. Owen Stanley—Explorations in South America—The Welle Problem (Schweinfurth)—The Partition of Central Africa.

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The Orómo, or Gallas, of the Harar—The Colonial Problem.

GOTHA.—*Petermanns Mittheilungen, and Ergänzungsheft Nr. 88.*

The Island of Corfu—Preliminary Report on My Ascent of Kilimanjaro (Dr. Hans Meyer)—The first Separate Sheets of Berghaus's Physical Atlas—On the Anomalies of Temperature on the Surface of the Earth—On the Occurrence of Tin in the Islands of the Riouw-Lingga Archipelago (between Malacca and Banka)—Observations during my Last Jour-

ney in East Africa (by Pfeil)—The Basins of the Tubarão and the Ararangua (Santa Catharina, Brazil)—Astronomico-Geographical and Magnetical Determinations made in selected places in N. W. Russia and N. Germany in 1885, 1886 and 1887—Explanation of the name Congo—A Run in the West Australian Desert—The New Edition of Sydow's Atlases—Journey in the Interior of Santo Domingo—Influence of the Destruction of Forests on the Climate of Australia—Explorations of Bunge and Toll in Yana Land and the New Siberian Islands—On the Construction of Isotherms—Journey between Kassala and Setit—The recent Danish Investigations in Greenland, 1887—The Ratio of Precipitation in the Russian Empire—On the Circassians.

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Penal Colonization in New Caledonia—The Sources of the Orinoco—The Western Sahara.

LILLE.—*Société de Géographie, Bulletin.*

President's Address—Camille Douls; Journey across the Western Sahara and Southern Morocco.

LISBON.—*Sociedade de Geographia, Boletim.*

Report on the expeditions to Muzilla's territory (East Africa) in 1882—Contributions to the Cryptogamic Flora of N. Portugal (in French)—Portuguese Congo: Report on the Congo Factories, and Commerce, the Labors of Stanley and the English Missions.

LONDON.—*Nature.*

The Birds'-Nest on Elephant Island of the Mergui Archipelago, (Coast of Tenasserim).

Royal Geographical Society, Proceedings.

Explorations in British North Borneo, 1883–1887—Notes of a Journey from Domasi Mission Station, Mount Zomba to Lake Namaramba (E. Africa), August 1887—Indian Marine Survey, 1886–87—An Exploration of the Rio Dôce and its Northern Tributaries (Brazil)—Notes on Demâvend—Work of the Native Explorer M—H in Tibet and Nepal in 1885–86—Siam—Gen. Strachey's Lectures on Geography—Note on the Map of Lycia-Pamphylia.

LYONS.—*Société de Géographie, Bulletin.*

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MADRID.—*Sociedad Geográfica, Boletín.*

The Western Sahara—The French at Timbaktu—Railway from Riga to the Pacific—Catalan Chart of 1339—The Island of Paragua (Philippines)—Scientific and Geographical Work in Bolivia—Liberia—The Panama Canal in 1886.

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Among the Portuguese in Southwest Africa—Australian Statistics for 1886—Life in the Austrian *Almen* (high or mountain-meadows)—The People of Croatia and Slavonia—La Comanderia (Cyprus)—First Years of a Colonist in the Primeval Forest of South Brazil—Wild Cattle in England—The Gran Chaco—On the Goajira Indians—An Adventure in the Western Sahara—The Indian Population in North-western Peru—The Heathenism of the Tcheremisses (in Central Russia)—The Herring Catch—Emancipation in Brazil—The Black Republic of Liberia—The Hudson Bay

Company in Past Times and Present—An Excursion in Brittany—Leipzig's Wholesale Commerce and Industry—Marriage in Carniola—A Winter in the Orkneys—The Household among the Bulgarians—Athens—Mas-sowah.

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HENRY E. PIERREPONT

BORN, AUGUST 8, 1808.

DIED, MARCH 28, 1888.

Mr. Pierrepont was one of the founders of the American Geographical and Statistical Society, and for the ten years from 1852 to 1862 a member of its Council.

Actively engaged as he was in business, and with constant demands upon his time from the many philanthropic and religious associations of which he was a conscientious and earnest member, he never failed to attend the meetings of this Society and to manifest by word and deed his interest in its welfare.

It is not given to many men to leave a record of such long-sustained and blameless service as his, equally precious to the few survivors of those who stood with him in the day of small things, and to the later generation that has taken up the good work.

At a meeting of the American Geographical Society held March 29, 1888, the following Resolutions were unanimously adopted:

Resolved, That in the death of Henry E. Pierrepont, one of the Founders of this Society, and for ten years, from 1852 to 1862, a Member of its Council, the American Geographical Society has met with an irreparable loss. When there was little but the sense of duty to bring its members together, Mr. Pierrepont, whatever might be the inclemency of the weather, or the other seeming obstacles in the way, travelled from his distant home to take part in the work of the Society. The interest, thus manifested in the early days, he continued to show to the end of his unsullied life.

Resolved, That this Society sympathizes profoundly with the afflicted family of the deceased, and that a copy of these resolutions be transmitted to them by the Secretary.

JOSEPH W. DREXEL

BORN JANUARY 18, 1830.

DIED, MARCH 25, 1888.

Mr. Drexel became a Fellow of the American Geographical Society in 1876, and a member of its Council in 1883. A man of large and liberal culture and especially devoted to music, in which his acquirements were unusually extensive and solid, he was drawn by a natural sympathy towards all organizations for the advancement of science and of art. To these he gave freely of the means which an ample fortune placed at his disposal, and not less readily of his time and his personal services.

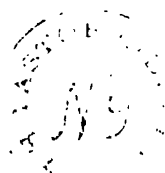
Not to speak of his charities would be to wrong his memory.

He was not only ready to respond to an appeal; he sought out those who stood in need, and endeavored so to aid them that they might regain their energy, and take up their own burdens. These things he did without weariness and without ostentation, living with serenity and with earnestness a well-spent life.

At a meeting of the American Geographical Society held March 29, 1888, the following Resolutions were unanimously adopted:

Resolved, That in the death of Joseph W. Drexel, a Fellow of this Society since 1876, and for the past five years a member of its Council, the American Geographical Society has sustained a loss not easily repaired. His association with the aims and objects of the Society was a natural outcome of the intelligence and liberal culture as well as of the genuine and active benevolence and humanity, which made him a centre of good influences in the community.

Resolved, That this Society extends its heartfelt sympathy to the afflicted family of the deceased, and that a copy of these Resolutions be transmitted to them by the Secretary.





TEMPLE WITH THREE TIERS OF COLUMNS.

BULLETIN
OF THE
AMERICAN GEOGRAPHICAL SOCIETY

Vol. XX

1888

No. 2

FOUR DAYS IN PETRA,

BY

WILLIAM BUTLER OGDEN.

WITH PHOTOGRAPHS TAKEN BY MR. WILLIAM H. RAU.

ON the 27th of February, 1882, a party of four of us left Suez for Mt. Sinai, Petra, via the "long Desert." We took the usual route to Sinai, stopping at Wady Feiran two or three days to make the ascent of Jebel Serbal, the toughest piece of mountain climbing I have ever done, and which has forever cured me of going to any place where I cannot ride. But I must say that the view from the top is glorious, extending from Suez and the coast of Egypt on the north and east, to beyond Sinai on the south, and the mountains on the other side of the Gulf of Akaba on the east.

Our party consisted of four Americans, our dragoon, a cook and a servant, and twenty-one Bedawin with eighteen camels to carry us and the luggage. The dragoon, Mohammed Achmet Effendi Hedayah, an Egyptian of Moorish descent, was by occupation a

silk merchant, and only acted in his present capacity when in want of recreation. He had an enormous nose, which was his pride, and I remember that, being near Beersheba, we happened to meet a sheikh who also had a large nose, which so disturbed Hedayah that nothing would do but we must measure the two features. This we proceeded to do with great solemnity, and the result being in the dragoman's favor, he was put in good humor all the day, and in fact long afterwards, whenever he happened to think of it. His greatest failing was his fondness for lying—but, taking him all round, he was an exceedingly good dragoman, and the most likely one to get us into Petra, if it were possible for any one to go there. The mention of Hedayah reminds me of what the late General Stone Pasha said about believing things in the East: "Believe nothing at all that you hear, and only one-half of the square root of what you see."

The last person who succeeded in making any stay at Petra was the Rev. Dr. Strong, in 1874. From that time till our expedition no one entered the place except a German gentleman and his wife (whom we afterwards saw in Jerusalem), who arrived at seven in the evening and were forced to leave at five the next morning, just two days before we arrived.

Lieut. Conder, R.E., is said to have succeeded in reaching there in 1883, but with this exception it is reported that no one has achieved the visit since 1882.

Leaving Sinai on March 13, we travelled in a northerly direction over Nugb Hudua and through the grand and beautiful Wady el-Ain to the Gulf of Akaba, and then by the shore to Akaba, arriving there March 18.

We found Sheikh Mohammed Benjad of the Alawin Arabs waiting for us.

He is a villainous old fellow, and very avaricious. We found that he had kept the German gentleman and his wife, above referred to, eight days before he would let them have camels, and that they left about two hours before we arrived. After a good deal of squabbling and threats of returning, we managed to get off March 21, going via Wady el-Ithum. On the third day we passed the ruins of Humeimah. They cover a large area, and contain a number of cisterns and tanks for collecting rain water. The principal ruin now is a room, an almost perfect cube in shape, of about twenty feet each way. Just outside is a hole, the size of an ordinary bucket, cut or drilled in the rock, and in it a spring that always just fills it and never overflows or dries up. A little south of Humeimah we passed over one of the battle-fields of Ibrahim Pasha, where cannon-balls and iron bullets lay on the ground in great numbers.

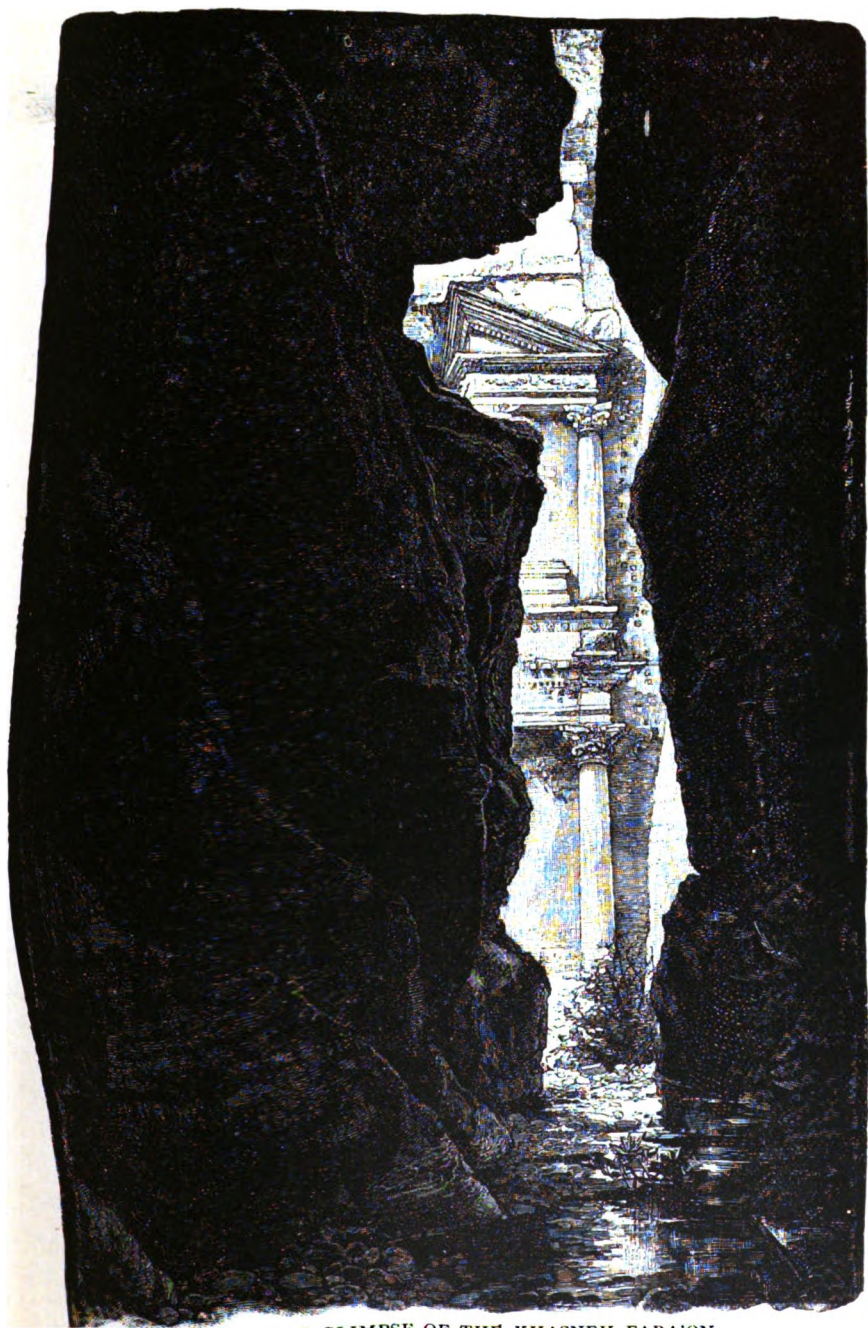
On March 24 we camped at Ain Dalagha, Petra being from about thirteen to fifteen hours distant. It is necessary to camp so far from Petra in order not to be molested by the Fellahin, or farmer-Arabs who infest the valleys adjacent to Petra, and take to the highway on the slightest provocation, or more truthfully said, perhaps, on none at all. Here we sent forward a scout to inform the Bedawin that we were to enter Petra, and that they must come and protect us from the Fellahin. It seems that the Sheikh of this tribe of Bedawin, Selim, who is one of the most powerful chiefs west, or rather south of the Jordan, was at one time in Hebron, and so careless was he that he was arrested for murder and rob-

side, but those that most attract attention are three monuments greatly resembling Absalom's tomb in the valley of Jehoshaphat. They are about fifteen feet square, with sides constructed after the manner of the Egyptian tombs and with flat roofs. In one is a small room with a door cut quite low. A few yards further, on the opposite side of the stream, is a monument, the lower story of which consists of a portico of six Ionic columns supporting an ornamented pediment. Above this is a plain façade sustaining, in a recess, four pyramids hewn out of the solid rock.

Another turn of the stream, and we come upon a cleft in the rocks spanned by an arch of masonry, formerly used to support an aqueduct. Now it is almost inaccessible. After passing this the gorge becomes narrower and narrower, and the cliffs higher and higher. We now have to ride in the bed of the stream, which is choked with oleander bushes in full bloom, filling the air with their delicious fragrance. In a little while we come to a small opening, which appears to have no exit except the one by which we entered. The stream seems to lose itself in the rock; but following it we find that it takes a sharp turn around a jutting piece of rock, and that the grandest part of the famous gorge of the Sik is before us. One can hardly see fifty yards in front, and so it is all along. It seems at each angle as if one had run into a cul-de-sac, and must turn back. The cliffs here rise to a height of three or four hundred feet, and they interlock so, that often for one hundred or one hundred and fifty yards at a time the sky is completely shut out from view. It is so narrow that one can easily touch both sides at once with out-stretched arms. On

the left side, going west, is an aqueduct tunnelled out of the rock, perhaps five or six feet from the ground. On the right are the remains of another, at a greater height, made of earthenware pipes let into the rock. In scratching away the stones and gravel underneath the feet, the remains of an ancient pavement are brought to light, deeply grooved by the passage over it of chariot wheels. Every few steps there are niches on the sides of the gorge, perhaps for the image of some god, and there are also tablets with obliterated inscriptions. After an hour or so of walking, we see a glimpse of sunlight ahead ; a turn or two of the stream, and we stop and catch our breath from sheer admiration and astonishment at the scene before us : a façade cut from the most delicate rose-pink tinted rock and of two stories, of which the lower one originally had a portico of four columns (one is now missing) but little in relief, and covered by a pediment delicately sculptured with vases and flowers. At either end of the portico is a projection having a column to support a cornice. The columns and the style of the whole building are Corinthian. Above is what appears to be another portico of four columns, but cut in two, and in the central space is a pagoda-like monument topped by a dome supported by four columns with figures in bas-relief between them, and the whole surmounted by an urn. There are figures also in relief between the columns of the divided portico above, and on the side projections in the first story.

Such is the Khasneh Fara'on, and with the bright morning sun shining on the pink rock there is hardly a fairer sight in the world. It gets its name, Khasneh Fara'on—Pharaoh's Treasure—from the urn, which the



FIRST GLIMPSE OF THE KHASNEH FARA'ON.

Arabs believe to be filled with jewels of the greatest value, placed there by Pharaoh for safe-keeping, and guarded by genii. Inside is a vestibule with a door opening into a room somewhat smaller, which has still a smaller one behind it. There are also chambers opening laterally from the vestibule. What its object was, or to what use it was put, is not known.

While we were admiring this building, we became aware of a rumbling noise which grew louder and louder, and we could distinguish most ferocious yells mingled with the clatter of horses' feet on the stones, and finally out dashed ten or a dozen Bedawin on horses and carrying spears twelve to fifteen feet long. It was Sheikh Selim's son Talag and followers, who had ridden far and fast to prevent our getting into Petra; but finding us already there, they made the best of it and proceeded to escort us to our camp in the centre of the city. Talag told us that his father, finding some of his neighbors' sheep attractive, was at present proceeding to add them to his own flocks, and would come to us during the night; in the meanwhile he (Talag) would do all that lay in his power to protect us. The fondness of the Arab for his neighbor's sheep has a good many illustrations in the life of the desert. Two days after our entry we were again standing before the Khasneh and a Fellah passed by with a sheep slung over his shoulder. One of the Bedawin who was with us stopped him, took his burden from him, emptied his wallet of all the piastres it contained, and giving him a prick with a spear, coolly told him to get out; which he proceeded to do with many howls of anger and grief. The Bedawin have as little respect for meum and tuum as the Fellahin,

but they are much more gentlemanly in conveying their plunder. To return to the story: At about half-past five we thought it well to be moving towards camp, and joining our escort we followed the stream into the city. After leaving the Khasneh, tombs appear with increasing frequency and of all styles, from the most elaborate with columns and carvings to the simple doorway cut in the cliff. We passed the ruins of the Tomb of the Greek Inscription, which fell during the rainstorm at the time Miss Martineau was here.

Suddenly the gorge widens to about four or five hundred feet and before us lies the Amphitheatre, having an arena of 120 feet diameter, thirty-three tiers of benches and a row of what might be "boxes" at the top. It is estimated that three or four thousand people could be seated here.

From the centre of this, the view on all sides is remarkable. More than a hundred tombs, temples, or habitations (whichever they may be) of all descriptions are seen. The cliff opposite the theatre first catches the eye, partly because the principal tombs are on that side, but more than that, perhaps, on account of its color or colors. They are in streaks from black, red, pink, green, yellow, blue, purple, lilac and so on, running through the whole gamut to white. Except in that it is a most beautiful object, it reminds one somewhat of Castile soap. The first tomb is the Tomb with the Arched Terrace, sometimes called the Temple of the Urn. The front elevation is composed of four Doric columns, topped by a pediment. In the centre is a door with a window over it, and still above are three more windows in the spaces between the pillars. The middle one of

the upper windows has some ~~figures~~ carved in bas-relief. The inside originally contained six rooms, which, it is said, "on ~~the~~ introduction of Christianity were converted into three for the reception of altars, and the whole temple was turned into a church ; the fastenings for pictures are still visible on the walls, and in an angle is an inscription in red paint recording the date of its consecration." The architect cut in from the face of the cliff about fifteen or twenty feet before beginning to carve out the temple. The platform in front is supported by a terrace of two rows of arches, one above the other. The sides are cloistered, as it were, and supported by five columns, but those on the right have been destroyed. Over the pediment is an urn, which has become a target for Arab bullets.

The next tomb of importance, the Corinthian Tomb, is about two or three hundred feet further on. The façade is composed of eight columns, supporting a very deep double cornice surmounted by a pediment. The second story is an exact copy of the Khasneh, with the exception that there are no figures in relievo. There are four doors, two arched and two almost triangular. The principal chamber has recesses in the walls and four table-like structures in the centre.

Close by the Corinthian Tomb is the Temple with three tiers of columns (*frontispiece*). It is, perhaps, the largest temple or tomb in the valley. The lower story has four doors with pilasters on either side supporting a pediment over each.

The second story has a row of eighteen Ionic columns surmounted by a similar row ; of which, now, only six columns remain. This is all that now remains, but

it is very probable that there was once still another story. In front, traces of paint appear and it is noticed that some of the capitals are fastened on, while it seemed to me that part of the top row of columns had been built of, or filled in with, stone masonry. In the interior there are remains of stucco work.

Next comes the Tomb with the Latin Inscription. The façade is very simple, having only pilasters at the angles, supporting a cornice and surmounted by a pediment. The entrance is small, and above it is an ornament of a semi-circular shape. Here on a tablet are three lines of Latin, containing the name of Quintus Prætextus Florentinus, who was a Roman Magistrate that died in Petra, while governor of Arabia. This is the only legible inscription that has as yet been discovered in Petra.

Just north of here are what were evidently dwelling-houses, for they have windows and there are benches along the sides of the rooms. The Tomb with the Sinaïtic Inscription for some reason or other we were not allowed to visit.

On returning to the camp, we found our tents pitched under the cliffs, a little north of the theatre. A dozen or so of the Fellahîn were standing about, and immediately on catching sight of us, began shrieking and yelling in a most ear-splitting manner. And from that moment till we were well out of the valley, we were never free from those terrible howls. It was only for a short time, about two or three in the morning, that we could hear each other when we spoke in our natural voices. Many times during the day we could not hear ourselves at all, no matter how loudly we called. The

Fellahin kept increasing in numbers every moment, till four days later there must have been considerably over a hundred around the camp, and each new-comer added his voice to the already deafening noise. While we were at dinner some Fellahin tried to get into the kitchen tent, but the Bedawin, who, by the way, were outnumbered four to one, drove them out. The noise increased, and we rushed out to see what was the matter. There stood Talag with drawn sword and flashing eyes, struggling to get at the Fellahin, but prevented by two of his own men. Sheikh Selim arrived at three the next morning with reinforcements. He came in the nick of time for us, for I am afraid that otherwise we should have been driven out. He told us that the German had been robbed by the Fellahin before he reached Petra, had been forced to pay a heavy blackmail when there, and had been driven out at five in the morning, having only arrived at six o'clock the previous evening. A cousin of Selim's, Faras by name, came in in the afternoon, and a more villainous face I never saw on any human being, or reptile. It was not long before he and Selim got quarrelling about the division of the spoils, and but for a remarkably agile dodge of Selim's, he would have had a very ugly looking knife between his ribs. However, it was made up in an hour or so. And so it was all the time we were there; there was fighting and drawing of swords and pistols every few minutes. We never left our tents without a guard of four or five Bedawin, and never for one moment were we free from the spying eyes of the Fellahin.

The cliffs behind our tents were honeycombed with caves and holes. Some of these appear very ancient,

perhaps more so than any of the monuments in Petra ; but otherwise they are of no special interest.

Two or three hundred yards to the west, on an isolated hill, is what Laborde called the Acropolis. The site is separated from the neighboring heights by deep and impassable gorges, and under the conditions of ancient warfare was, doubtless, quite impregnable. Remains of buildings are still to be seen on the summit. Just below it is a mound of rubbish, and I found, by turning up the earth with a broken stick, many broken bits of pottery, and among them two small oil lamps in almost perfect condition. From their appearance I should judge them to be quite old. The pottery is ornamented with figures, mostly geometric, in black or dark brown.

Now turning to the south-east and ascending a hill which rises from the base of the citadel, we see, on the left, the remains of a large temple, one column of which was still in its place in 1874. A little way beyond, several ravines branch out in different directions. Up one of these is a high platform made by a wall stretching from cliff to cliff. This is now in ruins. In the others are many temples and caves. On the left we see a façade with four columns, having between them two windows and three niches with remains of statues. The largest room is about forty feet long by thirty wide, and behind it is a smaller one with arched niches. Opposite this temple is an opening in the rock, and on entering we find ourselves in a large room, the sides of which are ornamented with thirteen fluted columns. Between many of the columns are niches, with grooves over them, for securing, it is said, ornaments or inscriptions.

A little further along is a staircase, with an immense

wall just beyond it. Ascending the stairs we come to a temple built in the Doric style. Continuing to the top, we find several reservoirs, the largest being about eighty feet long, twenty-five feet wide, and about twenty feet deep, all cut out of solid rock. There is also one with a double row of niches in its walls.

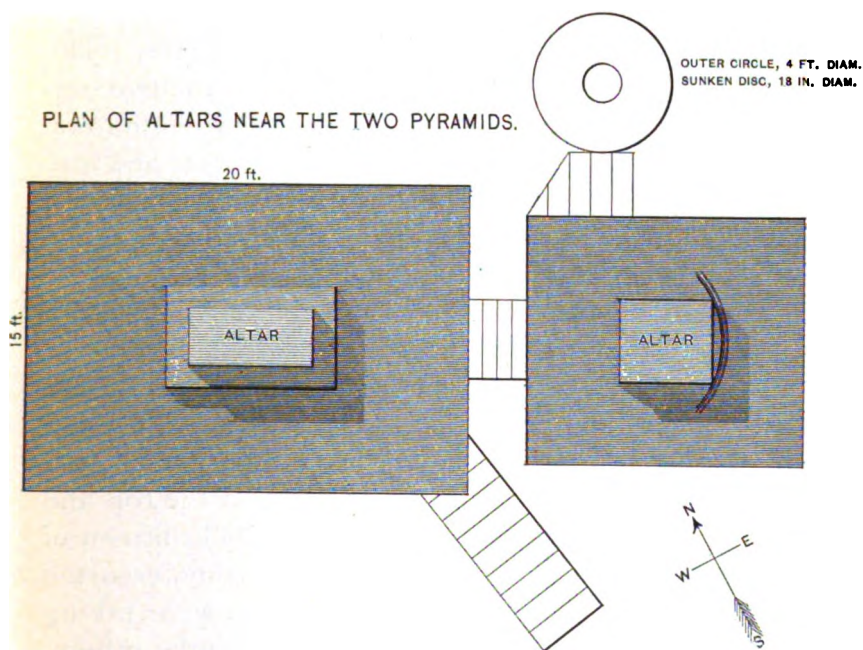
A few rods further and we come to a ravine, on the opposite side of which is a staircase cut in the rock. Following this to the top, there appear the foundations of a large building, which is supposed to have been a fortress. Just below this is the Pyramid, a small piece of undetached rock, about twenty feet high and perhaps twelve feet thick at the base. From here a long stairway leads down to the back of the Amphitheatre.

Looking to the south-west, one of our party, Mr. Rau, I think, saw what he took to be a second pyramid, but smaller and not in such good condition as the first.

This not being mentioned in any of the guide-books, nor in any of the other books on Petra that we had with us, excited our curiosity. So down we clambered, and crossing the gully, found a staircase leading to the top. Once there we found it to be levelled off, and a space about twenty feet long and fifteen feet wide cut out of the rock to the depth of about ten or twelve inches. In the centre of this is a raised platform, upon which is an altar. To the east of this, up four steps, is a raised platform on which is another altar, with a gutter around half of it. To the left of this last altar are four more steps, on mounting which we came upon a curious place, like a saucer in shape, nearly four feet in diameter, having a sunken disc of about eighteen inches diameter in the centre. Through the centre of this disc is drilled a

hole or drain, leading to a tank some few feet away. We supposed it might be one of the altars of Ba'al, perhaps, as it is well known that they used to build these altars in "high places."

Starting from our tents and walking towards the Acropolis, we come to the ruins of what was once a tem-



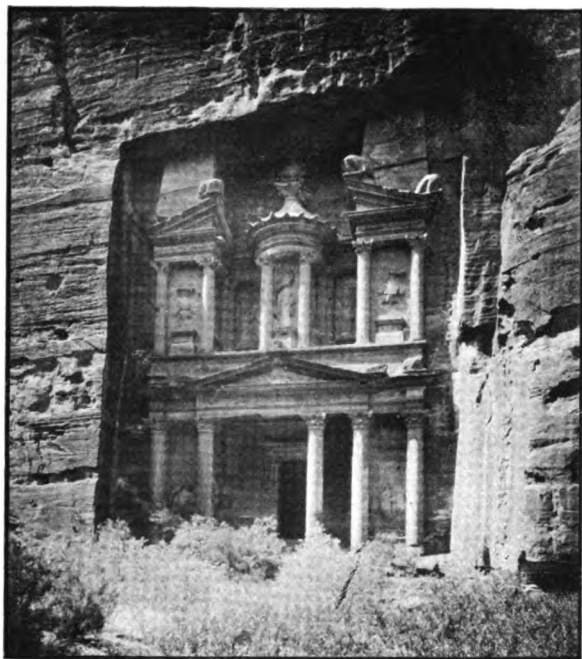
ple, but now its columns and its walls lie where they fell. Beyond are remains of a pavement leading through the débris of a Triumphal Arch to the Kasr Fara'on, Pharaoh's Palace. This building, with its columns of granite, is completely in ruins.

The last morning of our stay we went up to look at the Deir or "convent." The path up to it is very wild and steep, and in many places so narrow that it would

be impossible to pass but for steps cut out of the side of the rock. The Deir is 1,500 feet above Petra, and about an hour and a half's walk distant. After a final steep ascent we landed on a space about 150 feet square, level, and formed by cutting away the rock. On the northern side is an immense monolithic temple. That is the Deir. The façade is about 150 feet wide, by a little more than that in height, and faces Mt. Hor. The lower story has eight columns, and between the two outside columns at either end are niches like false windows. These columns are over seven feet in diameter and fifty feet in height. The interior consists of a large hall with an arched niche at the back. The upper story is somewhat similar in design to the Khasneh.

Directly opposite the Deir is another high cliff with remains of temples built there.

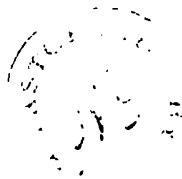
Returning from the Deir we met our camels at the Kasr Fara'on and proceeded to leave Petra. In about ten minutes we passed an unfinished temple, which tells how the Petrans worked, by commencing at the top and working downward. Sheikh Selim and about fifteen of his men, and twenty or twenty-five Fellahin, escorted us through the "Nugb" or pass. As we were taking leave of them, our Bedawin had a fight with the others, and I see by my note-book that "no harm was done, except that Hedayah got a sabre cut on his leg that ruined his breeches." We had two more fights before we were done with them, and although a good deal of ball and powder was spent, it resulted in nothing but a broken head for them and one prisoner for us. We had now to pass through a hostile country, which we did safely, and arrived at Jerusalem in time for the ceremonies of Holy Week.



THE KHASNEH FARA'ON.



AN UNFINISHED TEMPLE.



THE CITY OF MEXICO.

BY

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A THEME of universal interest is interwoven in the history, people, scenes and surroundings of the City of Mexico, which has been successively the seat of Aztec domination, the home of the Viceroy in the days when New Spain was the brightest jewel of the Spanish Crown, and lastly, in her best estate, the capital of the Mexican Republic. A strange atmosphere of beauty, romance, pathos and mystery envelops the past and present of this tropical city above the clouds, whose white walls, shining up to the clear sky, are nearly a mile and a half above the blue waves of the two oceans that lave, on the east and the west, the palm-fringed shores of the great plateau Republic. It was founded in its present form by Hernan Cortes and his followers, in the year 1522, on the ruins of the conquered Mexican city, Tenochtitlan, the history of which goes back to the epoch of the dawning pre-eminence of the Aztecs, who, at the time Columbus sailed on his voyage of discovery, had already made of it the foremost city in the New World. Under the Montezumas this people were extending their dominion in every direction, and demanding homage and tribute of all nations they knew, when their power fell irrecoverably to naught before the terrible arms of the Spanish Conquistadores.

The long, narrow country of Mexico, aptly characterized by Alexander Von Humboldt as the "bridge of the world," extends from north latitude $32^{\circ} 29' 45''$ to north latitude 15° , and from longitude $86^{\circ} 46' 39''$ to longitude $117^{\circ} 11' 40''$ west from Greenwich. Its greatest length, measured from northwest to southeast, is $1973\frac{1}{4}$ miles. At the northern boundary of Mexico, the North American Continent, cut into by the Gulf of Mexico on the one side, and by the Gulf of California on the other, narrows toward the south until it represents hardly more than the ridges and wide plateaus of the great Rocky Mountain Chain, that, stretching from Alaska, through British America and the United States, becomes in Mexico the Cordilleras, and in South America the Andes. The greatest width of Mexico, measured on the 26th parallel of latitude and including the Peninsula of Lower California, is 750 miles, and its minimum width in that great depression of the mountain chain, the Isthmus of Tehuantepec, is 140 miles. Although a non-maritime country, Mexico has an extensive seaboard. On the east, along the Gulf of Mexico and the Caribbean Sea, its shore line is 1613 miles in length, and on the Pacific Ocean and the Gulf of California it is 4168 miles, yet there is not a good harbor on its eastern coast, and on the west the commerce of its ports is insignificant. Its line of frontier with the United States extends 1789 miles, and its southern frontier adjacent to Guatemala and Balize, 532 miles. The area of the country is 766,000 square miles; its population was set down in 1882 at 10,001,884, of which 19 per cent., or 1,882,522 belonged to the Caucasian race; 38 per cent., or 3,765,044 to the native Mexican or Indian race; and 43

per cent., or 4,354,318 to the mixed rate. Politically, Mexico is composed of twenty-seven free and independent States, one territory, one military district, and the Federal district, in which is situated the city of Mexico, the National Capital.

In its physical geography and climate the Mexican Republic is divided from north to south into three zones, the limits of which are defined by gradations of altitude. On the seaboard on each side, the narrow strip of coast rising from the ocean level to a height of from 3,000 to 4,000 feet is known as the *Tierra Caliente*, or hot land, the characteristics of which are purely tropical. Above these slope up to the table-lands sunny, fruitful expanses called the *Tierra Templada*, or temperate land, with an exquisite bland temperature the year round, where are found all of the products of the semi-tropical regions. And above these in the form of wide, plain-like valleys lying between the mountain chains that, running from northwest to southeast, form the wide summit of the great ridge, are the high plateaus, generally between 7,000 and 8,000 feet above the sea, known as the *Tierra Fria*, or cold land. In this upland region above the clouds of the coast, the increasing altitude toward the south counteracts the effect of diminishing latitude, and even far within the tropics, gives to people from the north the impression of a wonderfully exhilarating and equable climate, in which the heat does not materially increase as they journey to the south.

As the traveller by rail, entering the Mexican Republic from the north, leaves the town of Paso del Norte in the Rio Grande Valley, he is at an elevation of 3,717 feet above the sea. As he advances the grades ascend,

and at the city of Chihuahua, 225 miles to the south, the elevation is 4,633 feet. He is now fairly on the table-lands, and, over the plain, sees, on the left and right, low mountain ranges which draw together in places, leaving only narrow passes through which the railroad winds, and these widen again into valleys. But few streams are met and these are insignificant in size, for there are no great rivers in Mexico. The plain continues to rise ahead, until at Zacatecas, 785 miles from Paso del Norte, the altitude is 8045 feet, after which point the grades rise and fall, but maintain a general level. In his progress of 500 miles a day there are revealed, but in more rapid progression, the phenomena that accompany a sea voyage to the south. The north star and the constellations that revolve about it sink, and new stars arise in the south. Dawn and twilight grow shorter, the brightness of day merging more quickly in the blackness of night, and the morning breaking, unheralded, in a burst of sunlight. There is but little change in climate and vegetation, except that the air is softer and plants grow larger and more numerous. The cotton and corn fields that border the track increase in extent and number, and there are signs among the people and their houses of greater wealth and more luxurious living. The cactus and palma, which, on the southern plains of the United States are, in the main, merely large plants, have grown, near the tropics, to trees thirty or forty feet in height, with spreading branches and massive trunks, which are used by the Mexicans for timber and fuel. The appearance physically and in costume of the natives changes toward the south. They are more comfortable looking, and their cotton garments

are not so frequently supplemented by the Saltillo blankets that were seen muffled about the Mexicans who were leaning against their house walls watching the train, in the morning and evening of the first day after leaving Paso del Norte. Otherwise the dress is quite similar, with the cotton garments, the sombrero or rebozo, and the sandals worn by both sexes.

On the third morning the train, a little after day-break, is entering the Valley of Mexico through that wonderful opening completed, after nearly two centuries of excessive labor and mis-adventure, known as the Tajo de Nochistongo, an immense cañon-like canal, varying from 278 to 630 feet in width, from brink to brink, with a perpendicular depth of from 147 to 196 feet. It was cut, in the 17th and 18th centuries, to drain the waters of the upper lakes of the valley, which, before its completion, often overflowed their beds and inundated the city. This wonderful ditch is 67,537 feet long, and, owing to the lapse of time since work on it was abandoned, has come to resemble a natural channel rather than a work of man. Emerging from the Nochistongo at its upper end, there lies in view ahead a level, mountain-encircled valley, of irregular shape, the general extent of which is about fifty miles in length by thirty-five in width. Below the level of the Nochistongo, there is no exit for the waters that gather through rain-falls and streams flowing down from the mountains, and in the depressions of this flat valley they have collected in a chain of shallow lakes, which, reckoned from north to south, are named Zumpango, Xalcotan, De San Cristóbal, Texcoco, Xochimilco, De Chalco. A little to the southwest of the centre of the valley, two miles west of the

border of Texcoco, the largest lake, the city of Mexico, compact and white, seen in the distance, seems, with its plain and mountain setting, a fair round gem in the light of the sun. In the days when the city was the Aztec pueblo, Tenochtitlan, its site was upon a group of marshy islands in the lake connected with the mainland by causeways, and easily defended by its fierce and independent people against assaults of their aboriginal enemies. The gradual subsidence of the lake through evaporation, the partial drainage of the valley by the Nochistongo, and the continual though slow accretion of the soil in a depressed location, have left the city of Mexico of to-day on the mainland, a little above the surface of the lake, yet anywhere within its limits, at two or three feet below the surface, one at the present time finds stagnant water. There is no effective system of drainage, and the influence of such conditions on the health of people who live near the ground is naturally most disastrous. Despite the salubrity of the climate, fifty-five out of every thousand inhabitants die yearly in the city of Mexico. This mortality is confined largely to the poorer people, who live in huts on the ground in squalid, over-crowded alleys, or as servants with quarters on the first floors of the houses of their employers. Those of the inhabitants who are well-to-do live in the upper stories of their houses, and so maintain a fair degree of health.

The city of Mexico is in latitude $19^{\circ} 26' 5''$ north, and longitude $99^{\circ} 5' 25''$ west from Greenwich. It is about two and a half miles square, and covers about four times the area of the Aztec City, Tenochtitlan, the material composing which went into the making of the new

city. It is built generally on the lines of the old city, and contains a population estimated at 300,000. The space where the Teocalli, or great temple of the Aztecs, stood is now occupied in part by the cathedral, and in part by the Plaza Mayor, or great public square. The National Palace, which fronts on the entire eastern side of the Plaza, stands on the site of the palace of Montezuma. The leading highways from the city are along the Aztec causeways, and the aqueduct that brings water from Chapultepec follows the course of the aqueduct made by the Aztecs in the reign of their ruler, Chimalpopoca.

A bird's-eye view of Mexico, as taken from Chapultepec, or the top of the Cathedral, shows a city more oriental than western in its characteristics, and antique in every aspect. There are the same flat-roofed houses and narrow streets and alleys one sees in the cities of Asia Minor, or Northern Africa, and on each side the expanse of white wall broken only by the strongly grated windows, and the massively built gate or door-way that leads from the outer world into the patio, or court-yard of the house, about which is grouped the life of the Mexican household. Back of these the green foliage of fruit trees rising above high walls, suggests the charms of the out-of-door life in the gardens behind these barriers. There are crowded business quarters, and markets swarming, like Eastern bazaars, with people. There are horsemen caracoling on superb steeds, donkey-boys and groups of tawny skinned natives wearing garments of white cotton and shod with rawhide sandals. Only above the wide expanse of flat roofs and walled enclosures, instead of mosque and minaret, rise in all directions the spires and domes of magnificent churches,

the types of that noble architectural genius that for three and a half centuries found in Mexico its whole scope in the erection of great religious edifices, the monuments of the illimitable resources and paramount power of the Catholic Church, which during that time practically controlled the wealth and political authority of Mexico.

This oriental aspect of the city is not merely superficial; in the streets and houses, and in the whole fabric of Mexican social life, there can be recognized the imprint on the Spanish race and character of the Moors of the Mediæval Ages. It is not more observable in Spain itself than in this American city, founded in the generation that saw the fall of Granada, and among the first colonists of which was doubtless many an old soldier who had fought in the armies of Ferdinand and Isabella. It gives a flavor of the Saracen to this city, founded under the Cross, and so long one of the most orthodox of the temporalities of the Roman Church. Owing to its remote and provincial position, and the jealous watchfulness of Spain, which, during the time Mexico acknowledged allegiance, excluded her from all contact with other nations, this country remained in usages and manners practically unchanged for three centuries. Even after its connection with the parent country was broken, it took another half century for Mexico, struggling through the throes of revolution, to adjust itself to the untried conditions of self-government, to get fairly into relation with the modern world. It is not only in the architecture and home surroundings, but in the manners of the people, that the inheritance from the Moor may be observed. As the Indian woman passes you in the

street, she draws a fold of her rebozo across the lower part of her face, a trace of the Moorish concealment of women's faces. People yet living in the capital recall that in former times the señoritas would throw a corner of their lace mantillas across their mouths on passing a man. Many Moorish words are incorporated in the language of this people. In its essence, however, the national character is a composition of the strong traits of the Spaniards and aboriginal Mexicans, each at the time of the Conquest, in the 16th century, the Imperial people of the respective continents in which they lived. Although the people of mixed Spanish and Indian descent now largely exceed in number those representing either of the unmixed races, there has been maintained on each side an exclusiveness that has preserved a large proportion of the pure type of each. The Spaniards possessing originally, through conquest, the wealth and dominion of the country, kept aloof until recent days from all alliance by marriage with the subjugated race, and so maintained the purity of the "sangre azul," as well as wealth and station. The Indians, sullenly resentful against the conquerors, lived by themselves in their primitive communities, adhering to the language and usages of the times of the Montezumas, and finding in their poverty the best security against encroachment by the dominant class. The only common feeling between the races was in the observance of the rites of the Catholic Church. The revolution against Spain, initiated in the year 1810, and brought to a successful conclusion in 1821, in which the Indians largely participated, brought the races nearer together in the fraternity of a common cause. In the fifty years of revolution that followed, the necessity,

among the different factions, of conciliating and enlisting this powerful element of the population, led to a steady advancement in the condition of the Indians, until we see, in the year 1860, a full-blooded Indian, Juarez, occupying the Presidency of the Mexican Republic. The last struggle of the Conservative, which was only another name for the clerical party, to uphold under the forms of an independent nationality the conditions of the old régime, resulted in the fated Empire and ending of Maximilian. On the re-establishment of the Republic, the confiscation of the immense property of the church followed, and the distribution among the Liberal leaders of its hoarded treasures gave many among the Indians and mixed race the money and estates requisite to maintain the rank they had acquired by their patriotism and valor. To-day there is found in Mexico no political discrimination on account of race, and the assertion of superior social position based upon pure Castilian descent is rapidly disappearing.

The founders of the city of Mexico, following generally the features of the ancient city, located the principal national and municipal buildings about the Plaza, where had stood the great Teocalli of the Aztecs. The National Palace fronting upon, and occupying the entire eastern side of the Plaza Mayor, is 675 feet in length. It is a massive building that has apparently grown by successive stages from a comparatively small beginning, and now contains the offices of the Presidency, State Department, Treasury, Headquarters of the Army, Archives, Senate, Astronomical and Meteorological bureaus and the National Museum. Within its walls, moreover, are barracks for several regiments, and here a strong force of

troops is constantly quartered. In it one finds a collection of portraits of prominent military and political leaders in the history of the Mexican Republic, from the time of the revolt against Spain down to the present epoch. Conspicuous among them are pictures of the patriots Hidalgo, Iturbide, Morelos, Guerrero, Matamoros and Allende, together with the presidents Arista and Juarez. Especially interesting is the National Museum. One of its departments occupies the lower floor on the north side of the Palace, and here may be seen the Indian religious relics, that have escaped the iconoclastic zeal of the priests, who, during the century following the Conquest, demolished every idol that fell in their way. Those here collected have been discovered in out-of-the-way places, or in the making of excavations.

The Aztec stone idols are indicative of the character and spirit of the people, and betray the inspiration that led to the human sacrifices in the rites of the Aztec religion. The figures are of varied sizes, the largest being an idol nine feet high, which is hewn, like most of the others, from porphyritic basalt, and carved with grotesque ornamentations. This is pronounced to be Huitzilopochtli, the War God and principal idol of Tenochtitlan.

A favorite religious symbol among the Aztecs was a serpent with feathers. This is emblematic of their great divinity and instructor, Quetzalcoatl, who was believed to have been their instructor in morality and civilization. The most noteworthy image among the several specimens of this class, is a large stone one in the south gallery, representing a coiled serpent, its body covered with feathers, rudely carved. A gigantic recumbent image,

holding upon its abdomen a round disk, is commonly assumed to be the god of Fire.

Of sinister appearance are the two great circular stones known as the Sacrificial and the Calendar stones, both elaborately carved and suggestive of the purposes for which they were used. The top of each is cut into regular devices, seemingly based upon an astronomical idea, or, it may be, definitive of the magnetic meridian and points of the compass. In the centre of the Sacrificial stone a bowl-like hollow, from which a groove leads to the side, is cruelly suggestive of the days when it stood as an altar upon the top of the pyramidal temple, and the victim garlanded with flowers was led up the stone steps and held across this stone, while his heart was cut from his living body by the obsidian knife of the high-priest and held aloft to the sun. Into this cavity his blood might drip and be carried off by the groove to the edge of the stone. The other, commonly called the Calendar stone, and which has a face carved in its centre, has been defined by Prof. Adolph Bandelier to be that form of sacrificial stone upon which the valiant captive taken in war was tied by the ankle and there fought chosen Aztec warriors sent against him in succession. If he vanquished them all, he was restored to liberty and loaded with presents, but if conquered and not killed outright, he was reserved for the sacrificial rites.

In other rooms of the museum is a collection of Aztec weapons, including the shield of Montezuma II.; here also is the strip of maguey paper, 48 feet long, on which the Aztecs inscribed the pictorial account of their wanderings from the time they left Aztlan in the north-west, near the end of the 12th century, down to their

establishment in the 14th century in the Valley of Mexico. Spanish standards, arms and armor and portraits of the Mexican Viceroys hang against the walls, conspicuous among them being the red damask standard of Cortes under which he conquered Mexico. There is a department devoted to collections in natural history, and, in glass cases in two corners of an interior room, a ghastly sight—five shriveled bodies of persons who, in the days of the Inquisition, had been walled up in the foundation of the Convent of San Francisco, and were brought to light during the demolition of parts of that establishment. These bodies are of a man, a woman and three infants, and the effect of the dryness of the climate and seclusion from the outer air has been to preserve them as veritable mummies,

The Diputacion, or Municipal Building, standing upon the southern side of the Plaza, contains the offices of the simply organized, but efficient Ayuntamiento, or city council, which with the resources at its disposal has made of the municipality of Mexico a city in many respects a model. To the east of this building is the Volador, the principal market, with stalls of venders fronting on narrow alleys. There are a number of markets in the city, all of great interest to the visitor. Here one sees to the best advantage the people of the different aboriginal tribes of Mexico as they bring their products in, often from remote villages, and spread them for sale upon the floors and platforms beneath awnings. In the garden on the north side of the Plaza, is a perpetuation of an Aztec custom in the shape of the flower market, with its awning of iron and glass and encircling counter, behind which are the Indian flower sellers.

About the Portales, arches over the sidewalk forming arcades, are the stalls occupied by venders of second-hand wares, and notably of old books. The general confiscation of church property, which became effective after the fall of Maximilian, scattered abroad that great collection of literature, secular and religious, that the Church institutions in Mexico had been three centuries and a half accumulating, and they have gradually fallen into the hands of the booksellers. Mexico is to-day a chosen field for the old-book collector.

On the north side of the Plaza is the Cathedral of the City of Mexico. Its foundations were laid in 1573, and it was finally dedicated in 1667. It is a stately structure, in beauty and magnitude worthy the great city in which it stands. Its architecture is a combination of Doric and Ionic: It is built of stone, and its cost was \$2,000,000. Upon its front are blazoned the arms of the republic, a token of the present supremacy of the civil over the ecclesiastical power.

The stranger has at first some difficulty in finding his way about the City of Mexico, from the fact that the names of the streets change in each block. The principal business streets are those of San Francisco and Plateros. During the eighteenth and the first quarter of the nineteenth century the China and East India trade of Spain was carried across Mexico. The goods of the east were brought by ship to the west coast, thence carried, by way of the city of Mexico, on the backs of Indians and of animals, to Vera Cruz and there re-shipped for Europe. In that way Mexico became the seat of a rich oriental trade. With changed commercial conditions in the world, this carrying trade across Mexico ceased.

A trip about the streets of Mexico reveals at every step objects of interest. The very names suggest memories of the Conquest. One street is known as the Puente de Alvarado, and at its side is an enclosed space showing the lines of an ancient canal across which, during the retreat of the Noche Triste (Dismal Night), when the Spanish forces under Cortes were driven from the city, Pedro de Alvarado made his famous leap in escaping from the victorious Aztecs. A beautiful church, now used as a hospital for the insane, San Hipólito, is associated with that disastrous retreat, it being the point where occurred the greatest slaughter of the Spaniards. It is especially notable for the curious carving on the outer angle of the wall surrounding its atrium, on which, cut in the white stone, is a commemorative device with an inscription.

An interesting feature of the larger Mexican cities is the aqueducts, that through the hills and over arches of solid masonry, bring water to the people. Mexico is supplied by two aqueducts, one leading from Chapultepec near at hand, the other fed by springs in the mountains of the Leones about twenty miles southwest of the city, and which from a point four miles away into the town rests upon arches of brick and stone, 900 in number, which support the thick wall in which lies the open channel.

On a high rocky bluff, a mile from the city and connected with it by the Paseo, the leading boulevard, is the Castle of Chapultepec, which is the Military Academy of Mexico, and the residence of its Presidents. About the base of the hill lie shallow lakes of sweet water overshadowed by groves of Ahuehetes, a species of gigan-

tic cypress, moss-draped and of great antiquity. A large one, called the Tree of Montezuma, I found by measurement to be forty-eight feet in circumference. Ascending the hill, one finds the white walls of its courts adorned with exquisite life-sized Pompeian frescoes, executed by order of the unhappy Carlota, the Empress of Mexico, during her short residence there. Legend relates that here was the summer palace of Montezuma, who could go to and from the city without observation by a subterranean passage.

Another noted feature of the valley is the Viga, or canal that conducts the waters of Lakes Xochimilco and Chalco into Texcoco. Along this canal one sees ever a procession of boats of various sizes, from the canoe in which the Indian woman paddles to market, up to the great barges, with crowds of merrymakers bound on a day's excursion. There are various towns and picnic grounds along its edges, favorite places of resort of the poorer Mexicans on Sundays and feast days. At the town of Santa Anita near the city of Mexico, are garden patches, separated by little strips of water, which were once the famous *chinampas*, or floating gardens of the Aztecs, but which in the subsidence of the waters of the lake have become part of the solid land.

Although long resident in the southwestern Spanish-speaking regions of the United States, and having often visited the Mexican Republic, I did not have the opportunity to visit the city of Mexico until the autumn of 1886. I arrived in the city on the morning of the 30th of September, just at the close of the rainy season, which begins about the 1st of July. During three months a heavy thunder shower may be counted on for each af-

ternoon. The rest of the year the weather is fair. I was a guest at the house of that accomplished journalist and Spanish scholar, Mr. Frederic R. Guernsey, editor of the Mexican Financier, who was my guide and companion in many pleasant excursions about the capital and to outlying towns. He was living in a beautiful house on the Calle de Humboldt in the true Mexican fashion, and with his wife and family was thoroughly assimilated with the country and its ways. I found at this season the most delightful weather, the air fresh and bracing, cool in the night and morning, but bright and warm in the middle of the day. One of the first cautions of my host was to take a light overcoat with me, whenever I went out of doors, and to walk always on the shady side of the street. The sunny side would not have been uncomfortably warm at this season, but so comparatively great are the chill and dampness of most of the house interiors that one is likely to take cold on coming in and sitting down after exercising in the warmth of the sun.

I had become a fair amateur photographer in anticipation of this visit to Mexico, and had brought my camera with me. My days in the city included many photographing excursions about the streets. One of the first pictures that I attempted was that of a pretty Indian market-girl, who with a donkey, laden with leeks and onions and lettuce, was waiting for customers on the street. She, like most of her class, was graceful and symmetrical of figure. A sombrero, or wide-brimmed hat, worn alike by the Indian men and women, surmounted her long, braided hair, and matched well with her bright skirts. In setting my camera, I discovered an attribute

invariably displayed wherever I attempted to make an out-of-door photograph in Mexico, the inordinate desire of the commonalty to be included in the picture. Before I had my instrument focused, with the handsome Church of San Hipólito as a background, a crowd of Indians and of the mixed race gathering from unknown quarters had formed about the girl and the donkey, making a detailed view impossible. My efforts to disperse them were ineffectual, the only result being a delay that served to collect a larger crowd. Presently a gendarme, one of the soldier police, seeing the gathering, came to my relief, and by considerable exertion, backed by the use of his club, succeeded in getting the mob immediately in front dispersed so that they did not come actually between me and my subject. But upon the people packed densely behind he was unable to make any impression; so signifying to me that he had accomplished all that official authority could effect, he composed his features into an expression of great deservingness and struck a heroic attitude in a position to be included in the foreground of the picture.

I never wearied of the types of people that I encountered on the streets. The different tribes of Indians had each, with a general similarity, certain marked points of individuality, but I found all ready to stop from their pursuits to have their pictures taken. The old pottery vender and his wife, as they came into town with their wares, the woman leading the donkey loaded with immense earthen pots, and the man bearing a similar burden on his back;—the party of Indians of a different tribe, with their wide sombreros, and hampers on their backs which they had brought into the city in the morn-

ing loaded down with pigs, chickens and vegetables, and now, at noon, leaving on a dog-trot, for their villages ;—the crowds gathered in the markets about hampers, earthen pots, baskets and piles of matting, with great pyramidal heaps of fruits and vegetables piled in front of the sellers ;—and, generally, the innumerable phases and aspects of daily life among the mixed and native races, offered a picturesque succession of subjects for the photographer. I was particularly struck with one Indian woman of a tribe across the mountains toward Tlaxcala, who was selling fruit among her people in a market. She wore the usual sombrero, with a dress and rebozo of rather better pattern than those of the people about her, and the black bands which held her dress at the shoulders were decorated with stripes of bright metal. In her I saw a representative of the old Indian nobility, and felt I could appreciate the force and fierceness of this free people, who are proud of their past and whose greatest epoch lies in the future. Her look of fearless indifference and the lurking flash in her sombre black eyes revealed the elements of strength and of danger that characterize the descendants of the allies of Cortes.

Any description of the City of Mexico would be incomplete which did not treat of pulque, the beverage of Southern Mexico, and particularly of the capital and the region about it. The pulqueria, or pulque shop, is to the Mexican what the beer saloon is to the German. There are 817 of these shops in the City of Mexico, patronized during the day by all of the lower orders. The wealthy people have pulque served at the table at home. The pulqueria is usually located at a street corner and bears a title intended to be attractive, and coats

of arms, gaudy pictures and inviting inscriptions are painted upon its exterior. Over its doorway, from one side to the other, hang green strips of the maguey plant, which corresponds to the traditional bush that indicated the wine-shop in early Europe. Besides the pulquerias, at every place of public gathering in the city there are to be found people carrying pigs' skins filled with pulque which they dispense in earthen mugs to thirsty customers. One has to learn to like the pulque, its taste being unpleasant to the unpracticed palate. It is highly recommended on sanitary grounds by the local physicians. The pulque is the fermented juice of the maguey or century plant, and the plains between Mexico and Vera Cruz are the most noted for its production. It is a beverage containing about the same percentage of alcohol as lager beer, but with a slightly narcotic effect. One of the excellent municipal laws of Mexico, which in its application differs from the sumptuary laws of the United States in the fact that it is enforced, orders that all pulque shops shall be closed at six o'clock, P. M., which prevents a vast amount of crime that would otherwise prevail under cover of darkness among the lower classes.

The water carrier is one of the features of Mexican life as, with his great earthen jar upon his back, held by a strap passing across his forehead, he goes about delivering water at the houses. Equally interesting are the little street stands where women of the Indian and of the mixed race sell Mexican delicacies which they cook at little fires of charcoal. The seller of enchiladas, or tortillas spread with an attractive mixture of chopped onions and Chili peppers; the *buñuelera* vending frit-

ters, dipped in syrup or honey; the keeper of the figon, or little inn, who, under the shade of a piece of matting, ladles out the savory Mexican stews, highly flavored with chili and garlic, to her hungry customers; the florista or flower seller, with arms full of flowers, her baby, it may be, slung by her rebozo to her back;—these and many another quaint figure are familiar sights in the streets of Mexico.

The Mexicans, like their Spanish ancestors, are very careful and precise in classifying each shade of intermixture of races. Those women in whom the blood of the negro intermingles with that of the Spaniard and Indian, are called *Chinas*, and, with their magnificent dark eyes, cream-tinted skin, beautiful forms and bright, picturesque apparel, are among the most beautiful of the lower class in Mexico. The beauty of the higher class of the Mexican women is proverbial, and is attractive in all its types—whether the blood of the Indian gives a duskier tinge to the cheek of the *señorita*, or one catches the suggestion of the people of Northern Africa in the Moorish contours of some face beneath the lace mantilla;—in the clear, olive complexion, black hair, flashing white teeth and impetuous movement of the girl representing the race of Southern Spain, and the blue eyes, fair skin and sunny hair of the proud *señorita*, whose descent has come through the Visigothic blood of Northern Spain.

On going to Mexico, I was so fortunate as to possess the entrée to much that is pleasantest in the social life of its people, but I found the people of the better class, even where I did not go with a special introduction, always perfectly willing that I should enter their houses,

and make any interior views with my camera. The large, plain-looking houses which, seen from the street, show nothing more than a blank wall broken by one great entrance flanked by grated windows, I usually found to be homes of elegance and luxury within, with walls decorated with paintings of a high class, with fountains and shrubbery in the court, and spacious gardens in the rear bounded by high walls which enclosed shade and palm trees and a profusion of tropical flowering plants.

The domestic life of the well-to-do Mexicans is serene and beautiful. Among the women and girls, except on the occasion of formal visits to other households, the invariable attendance at morning mass, and stated shopping excursions, existence is essentially a home life secluded from the world, but expansive and happy within the house. For amusement beyond there is the occasional theatre, opera, or grand ball, the evening drive on the Paseo; and the Sunday forenoon promenade on the Alameda. In many cases the beauty of the women survives through life, in all its changes. Large families are the rule, and the mother, to whom unquestioned obedience is rendered, is a companion as well as an older sister to her children. The poorer class have few wants and are content and happy in their sphere.

The paved courtyard of the house in which I was a guest was common to this and another house. In the rear was the porter's lodge, and all exit and entrance through the great double door that closed the outer entrance was attained through the medium of this functionary. From the nature of its house construction and domestic fashions, Mexico is a country where men do

not carry night keys, and women do not look out of the windows to see what is going on in the street. For sanitary reasons, the pavement of the courtyard was at an elevation of at least six feet above the level of the street, and the house floors were three feet higher than the yard. The verandas opening upon the court were set completely about with flowers. In and out during the morning came venders of vegetables, fruit, charcoal and the other things that go to the daily supply of a Mexican household.

The Mexican police, the gendarmes, organized in their present form during the reign of Maximilian, are a model force, exceedingly neat of appearance, with blue uniforms, white canvas gaiters and military fatigue cap. They are armed with a club or sword and revolver, and have the faculty of not obtruding when not needed and of being always on hand when required. They are invariably civil in address, and stand ready in case of a dispute with the public carriage-drivers to adjudicate and settle the matter according to the rates prescribed in the municipal ordinances.

The bull-fight, with all its pageantry, bright coloring, movement, danger and slaughter is the favorite amusement in Mexico, and with time gains rather than loses its hold on the popular heart. Until recently the fights for a long time have taken place in localities outside the Federal District, but a large bull-ring has now been built in the city proper, and the recent entertainments given therein surpass any ever before known in the history of Mexico.

The Alameda, or public pleasure ground, found in every considerable town of Spanish-speaking people, is

a noted feature here. It is a large level space, shaded by poplars and other trees, with flower beds and shrubbery, fountains, walks and seats which people may occupy at all times. It is in the mornings a favorite resort for the student and a playground for children. On Sundays, after mass, near the hour of noon, it is a meeting-place of the fashionable people, who go there to pass an hour in listening to the superb music of the military band, to meet acquaintances and to walk about. Among the buildings fronting on its south side stands the great white Church of San Diego, memorable as being the edifice from which heretics were led to execution in the days of the Inquisition. The Quemadero, or burning-place, was on the Alameda at a place now indicated by a fountain and electric light. It was a high square stone platform with a terrace, stakes and chains, and as, in those days, the square was a vacant space, the entire population could collect within view of the Quemadero to witness comfortably a public burning. Twenty-one people have perished here on a single occasion of this kind. English sailors unfortunate enough to be captured by Spanish cruisers in the Gulf of Mexico, off Vera Cruz, were frequent victims of the Inquisition. Often in returning from my excursions I crossed the Alameda in the shades of evening, inhaling the fragrance of the tuberose and that night-blossoming flower which the Spaniards call *La Dama de Noche*, the Lady of the Night, and saw the mellow flame of the electric light above the old burning place, illuminating the green foliage of the trees and the front of the church of San Diego. Then I best realized the contrast between the old and the new times, and the great liberalization that has

come to Mexico now fast growing into harmony with the spirit of modern progress and improving to her advantage its latest results.

Since the suppression of the clerical establishments under the Laws of the Reform, there has been inaugurated a public school system which is yet, however, hardly more than a beginning. In 1886 there were in the City of Mexico 101 free secular schools, attended by 7,400 pupils; 24 free Catholic schools, attended by 4,049 pupils; 37 Protestant schools, attended by 1,340 pupils; and of private, paid schools within the municipal limits 128, attended by 2,900 pupils. Including the higher schools and colleges the total number of educational institutions within the Municipality is 288, with a total attendance of 15,754.

Among the educational institutions of a higher order are the Conservatory of Music, a School of Engineers, the Medical College, Preparatory School and Colleges of Architecture, Commerce, Jurisprudence, Theology, and those under the offices of the Lancasterian Society, the Benevolent Society and the Catholic Society. Most of these were originally founded under the auspices of the Catholic Church. There is a creditable list of over a dozen hospitals and asylums in the city, which includes the Hospital of Maternity and the Foundling Asylum. These are largely the successors or perpetuation of benevolent institutions founded by the Church in earlier days.

In the way of places of public entertainment, there are the Teatro Principal, founded originally in the 17th century by the Brothers of San Hipólito, in order to obtain funds wherewith to sustain their hospital, and the Teatro Nacional, the principal theatre, finely arranged

in its interior with a seating capacity of 3,000. At this theatre one or more leading theatrical and operatic companies fill engagements of several weeks each season. There are several other theatres, and the city is visited often by circus companies which are quite popular, though the tastes of the Mexicans are best satisfied by the bull fight.

In the way of daily recreation a morning horseback ride, or an evening drive on the Paseo de la Reforma, the favorite Mexican boulevard, is always in order, and on the latter occasion one witnesses a good representation of the wealth and beauty of the city. A sail upon the Viga, or a trip to some of the beautiful suburban towns, as Guadalupe, Chapultepec and Molino del Rey is always a pleasant excursion for the visitor to the city, and horse cars run to many picturesque places beyond.

The social life of the people of Castilian and of mixed descent is essentially that of old Spain. The Indians have adopted little more of the Spanish customs than is attached to the church rites, and even these are tinted with the spirit of the ancient pagan worship. The events in private life that call forth the greatest celebration are death and marriage, and even among the poorest the ceremonies of the funeral and the wedding are as magnificent as their means will admit.

At Popotla, a little way out of the city, stands one of those ancient trees known as the *ahuehuete*, surrounded by an iron railing. To this tree is attached a touching memory of that disastrous time in the History of the Conquest, the Dismal Night when the army of Cortes was driven out of the city, his forces largely destroyed, or disarmed, and his scheme of conquest seem-

ingly rendered hopeless. At this place the Commander was able to stay the rout of his troops, and gain a few moments for rest and consideration of what to do in their desperate strait. Sitting beneath this tree, known ever since as the Tree of the Dismal Night, Cortes wept. From that day the tree has been preserved sacred in memory of this moment of despair that came once to the iron-hearted Conqueror of Mexico.

The ruling class in Mexico now includes people of the Spanish, of mixed and of pure Indian descent. There is among the class in authority a decided talent for administration and statesmanship. In diplomacy, the United States Government has not shown to advantage beside the Mexican. A glance at the portraits of the Viceroy and Mexican Presidents, hanging against the walls of the National Palace, shows a very superior set of men, looking every inch fit to govern. It was a daring piece of statesmanship, the initiation in 1859 of the great scheme of reform, by which the overshadowing power of the church was curbed, and her hoarded possessions were confiscated to the State and thus diffused through the country to aid the development of a new national life.

President Comonfort, in 1852, struck the first blow in his contest with the Monastery of San Francisco, the successful issue of which established the precedent that State was supreme above the church. Following him, Juarez had the courage to enact the sweeping Laws of the Reform; but before they could be made operative there came the long struggle with Maximilian. After the fall and execution of this Emperor and the re-establishment of the Republic, the delayed blow fell upon the

church property in the form of wholesale confiscation, suppression of all religious orders and curtailment of the powers of the priesthood. Following Juarez, who had prepared the way, have come the first and second administrations of the present President, Porfirio Diaz, and with these the full beginning of the era of national progress that is placing Mexico abreast with the foremost people of the time. Under his government have come the railroads from the north, the free schools, the wide system of internal improvements, the establishment of peace and safety to the country and stability to the government. The recent change in the constitution extending the term of the Presidency to six years, and permitting the President to succeed himself, by practically insuring the continuance of the administration of Diaz, gives a guarantee of safety to capital and vested interests most salutary to the prosperity of the country.

There are many undeveloped possibilities in the Mexican character. The talent of their artists in the execution of works on a grand and noble scale is pronounced. Their allegorical and historical paintings and statuary indicate a national genius of a high order. The colossal equestrian statue of Charles IV., a work executed wholly in Mexico at the beginning of this century, ranks high among works of art of its class. It was cast in solid bronze, weighs thirty tons, and the height of the horse and rider together is fifteen feet and nine inches. It is set in a commanding position upon a pedestal in the Plazuela, at the western end of the Avenida Juarez. In public places of the city are statues of Columbus, Guatimotzin, the last Aztec ruler, and other

notables ; but the one that most appeals to the Mexican heart is the tomb of Juarez in the cemetery of San Fernando. It is a Grecian temple of marble with low roof, held up by rows of columns, and on the base, thus sheltered, reposes a full-length statue of the dead President, his head supported on the knee of a mourning female figure of Mexico. His title of the Liberator, accorded by all Mexicans, marks the veneration in which his memory is held, and this tomb and its associations are an inspiration of patriotism to the Mexico of to-day.

A rare and wonderfully transparent atmosphere clothes the mountain slopes, the valley and the great city. From distances of thirty or forty miles away on the southeast, but seemingly near at hand, the snowy summits of the grand volcanic peaks, Popocatepetl and Ixtaccihuatl, overlook the lower mountains that lie between them and the valley. Seen from the city with perfect distinctness, pure and white against the deep blue of the sky, they are a cool and refreshing sight in this tropic land. The top of the latter mountain resembles with singular perfection of detail a reclining woman, beneath a spreading white sheet. The very backward flow of the hair is indicated in the contours of the snowy mantle, and the poetic Spanish name *La Dama Blanca*, The White Lady, is the common appellation.

There is a grandeur in the scenery that is finding its counterpart in the development of national character. Mexico has shaken off the trammels imposed upon it when the ecclesiastical power was supreme, and has awakened to the light of the present era. In the new liberty an epoch of hope and vigor is with her, comparable to that of peoples in history when just advancing from

barbarism into civilization. The Mexicans are not inherently an inferior people. The swift degeneration of the Spanish power arose not from any decay of the race itself, but from the operation of a destructive political, economic and ecclesiastical system. Now that Mexico has assumed in reality as well as in name the character of an independent nation, upon this awakened race will fall, as upon a fallow soil, the quickening seeds of art, of science and of literature, which will develop contemporaneously with the increase of the country's material prosperity. From the north comes with every train the communicative throb of the life of a more advanced nation which is working upon the same lines, and the inculcation of the precepts that have made successful the republican experiment of the United States. From across the broad Atlantic are imparted the warnings and lessons of monarchical government, and the existence of the forces that are compelling their liberalization in Europe. And from all sides is coming in an immigration of enlightened people that brings a supporting force to the cause of good order. The formation of a strong national feeling is indicated in the increasing stability and permanence of the Mexican Government. Among the great populations destined in the future to inhabit the North and the South American Continent, Mexico will find her place in America corresponding to Italy in Europe, and temples of art and science will adorn the sunny slopes that stretch down on one side to the shores of the Pacific, and on the other to the blue waters of the great Gulf, the Mediterranean of America.

THE ORIGIN OF THE NAME "AMERICA."

BY

GEO. C. HURLBUT.

AN article under this title in the Bulletin of the American Geographical Society, No. 4, for 1886, was devoted to an examination of Mr. Jules Marcou's theory that the name of the New World was taken from that of a mountain range in Nicaragua, and was, therefore, of purely American origin. This theory was advanced in a paper contributed by Mr. Marcou to the *Atlantic Monthly*, as well as to the *Bulletin* of the Paris Geographical Society, in 1875. He has now returned to the subject.*

If his theory, as first published, failed to meet with acceptance, the reason for this lay rather in the inherent weakness of the argument than in any defect of style or manner in the paper itself. It is, unfortunately, impossible to say as much for the present work. The argument has gained nothing in strength by the lapse of time, and the spirit which pervades this pamphlet of eighty pages is not to be commended.

Mr. Marcou holds that four facts dominate the question as to the origin of the name, America. These facts are :

1st: That *Amerrique* is the Indian name of the mountains between Juigalpa and Libertad in the prov-

* *Nouvelles Recherches sur l'Origine du Nom d'Amérique*, par Jules Marcou. Paris, 1888 (From the Author).

ince of Chontales, in Nicaragua; and these mountains separate Lake Nicaragua from the Mosquito Coast. The word *Amerrique* signifies, in the Maya language, "the country of the wind;" "the country where the wind blows constantly."

2d: The Christian name of Vespucci is *Alberico* in Italian and in Spanish, *Albericus* in Latin.

3d: No other name has ever been subjected to so many variations and combinations, whether deliberate or unconscious, as the name of Vespucci. There is no parallel instance in the history of distinguished men. Excepting the name *Alberico*, not one of the names is found in the nomenclature or the calendars of the Italian and Spanish saints, although Vespucci lived at the time of the greatest fervor and the absolute supremacy of Roman Catholic Christianity. Finally, not one of these names, *Americus*, *Amerigo*, *Amerigo*, *Amergio*, *Americo*, *Almerigo*, *Albertutio*, *Almerico*, *Morigo*, *Damerigho*, *Armenico*, *Eméric*, *Aimeric*, *Alméric*, and *Améric*, is a diminutive, or an accepted form, either in Italy, or in Spain, or in France, for *Alberico*, *Albericus*, *Alberique*, *Albéric*, *Albert*.

4th: Before 1507, the date of the publication of the name *Americus*, by Jean Basin, at Saint-Dié, the name is not to be found in any printed document, nor in any manuscript document of recognized and unquestionable authenticity.

These are Mr. Marcou's four facts, and they do not all stand examination.

1st: The range of mountains in the Chontales province bears among educated Nicaraguans the name of *Amerrique*; and the orthography of a word is to be

learned from the educated, not from the ignorant, men who use it. The *Amerrique* tribe, which gave its name to the range, is fast fading away, and there seems to be no reason for believing that the law, which works in all other languages, does not work in theirs. Names are a part of language, and language is, like Falstaff, in a state of continual dissolution and thaw. If it were not for the written form, preserved for us by educated men, who could guess that the spoken word *Chumlee* was spelled *Cholmondeley*, or *Shonggum*, *Shawangunk*, or that the salutation *M'sieu*, to be heard from every unlettered Frenchman, was properly *Monsieur*?

It is supposed that the *Amerriques* were once powerful, but very little is known concerning them. The decay of their speech must have gone on for a long time before civilized men had occasion to note the tribe, and the name by which the people and the mountains are now known is, not improbably, the bare remnant of the original word, which may very well have been something like *Amerristiquique*, shortened successively to *Ameristique* and *Amerrique*; to which latter shape the arts of writing and printing may give permanence.

2d and 3d: Mr. Marcou would deal much more easily with the name of Vespucci if he spent some time in renewing his familiarity with the printed books of the 16th century, and in noting the indifference to orthography which marks them all, even those in Latin. The Italian books are more nearly correct than those in the other modern tongues; but not even in Italian was there a fixed standard.

Paolo is spelled indifferently *Paulo*, *Polo*, *Paholo*; and Michael Angelo writes it *Pagolo*. There are five or

six forms and three different accentuations for the name *Niccolò*. *Caboto*, an easy name, is spelled in eleven different ways. If we omit, as we should, from the fifteen equivalents of *Alberico* given by Mr. Marcou, all but the Spanish and Italian forms, the number is reduced at once to ten. Two of these, *Albertutio* (Albertuccio) and *Morigo*, are diminutives, and are not to be counted. The other eight explain themselves as modifications of the original *Alberico* to any one who remembers that the seamen who commanded and worked the Spanish ships spoke at least six different Spanish and Portuguese dialects, or tongues, and quite as many of Italy and the Italian islands. The sea-change that a Tuscan name would suffer under such conditions is illustrated by the case of Vespucci as well as by the familiar example of *Livorno*, turned into *Leghorn* by the Genoese who traded with England.

4th : This well-known fact may be admitted without remark.

Mr. Marcou has found thirty-four places in America between Costa Rica and Greenland with names ending in *ique* or in *ic*, terminations equivalent to each other. He affirms that no document of the 16th century gives the name of an American plain, or plateau, or range of mountains.

Coming to St. Dié, in the Vosges, he takes an opportunity to describe the translator of the *Quatuor Navigations*, Jean Basin, and his associates in the Gymnasium, the Luds (Gauthier and Nicolas), Pierre de Blarru, Laurent Pilades, Mathias Ringmann, Symphorien Champier and Jehan Aluys.

Waltzemüller (*Hylacomylus*), who has hitherto

passed for the scholar that applied the name of America to the New World, was, if Mr. Marcou is right, no scholar at all, but a mere printer, the foreman of the establishment which brought out the productions of the Gymnasium.

He was also, on the same authority, a German from beyond the Rhine (p. 22), a vain fellow (p. 31), an excessively vain fellow, a braggart, a pretender (p. 33), a pillager and pirate (p. 34), an ambitious and grasping fellow (p. 35), an audacious fellow (p. 40), worse than a counterfeiter, a plagiarist and a veritable pirate (p. 42), and a blockhead (p. 45). With all these excellent gifts, Waltzemüller,—so Mr. Marcou affirms—was guilty of appropriating other men's labors (p. 32), played a pitiful part (p. 33), delayed the working off of the first sheet so as to change the text to his own advantage (p. 36), stole, or would have stolen, some copies (p. 37), and tried to fleece in a shameless fashion his associate Frenchmen of the Vosges (p. 40).

The true author of the passage which first applies the name of America to the New World was, if Mr. Marcou is right, Jean Basin, a Frenchman, or a native of Lorraine who spoke French (p. 47), an elegant poet, and a modest man (p. 32).

When we enter upon conjecture, we must remember that that field belongs to all. It is not a little surprising that Mr. Marcou, who has travelled as far as Greenland in his search for names in *ic*, should have overlooked the rich harvest waiting for him in Western and North-western France, where there must be forty or fifty places delighting in this termination. With a little ingenuity, a theory might be made to show either that Greenlanders

colonized France, or that Central America was first settled by Bretons and Frenchmen, who left behind them the name *Amerristiquique* or *Amerristiquiquic*, to be abbreviated in later days, and to become the cause of considerable wind. The suggestion will be enough for Mr. Marcou, who has already noted the impressive fact that French is the only cultivated language in which the name of the Western Continent is identical with the degraded Indian form *Amerrique*. There is more in this than meets the eye; and even the thoughtless reader recalls with mingled astonishment and awe Gibbon's somewhat similar remark on the identity of the name *Pierre* with the word for *rock* in the French version of the Allocution, "Thou art Peter;" though the historian's skeptical turn of mind kept him from following the hint to its logical conclusion that the French was the original text.

If Mr. Marcou were not so sure of his facts, it would not be easy to believe him when he says that the American plains and plateaux and mountains went without names in the 16th century.

The longer the assertion is considered, the harder it is to believe. One of two things must be true: either the mountains and plains and plateaux did not make their appearance until the year 1601, or Mr. Marcou is mistaken.

It may be admitted without hesitation, though it is not proved, that Waltzemüller was a mere printer, the foreman of the office and corrector of the press; and to admit this is to recognize that he must have been a man of unusual intelligence, and a scholar. Even to-day, when the conditions have been greatly modified, the foreman

of a printing-office, whatever else he may be, cannot be a blockhead, and in the 16th century the foreman was, of necessity, a scholar, familiar with Latin and with Latin writers, and often with Greek.

It is quite certain that no printer of those days could have made the blunder, which Mr. Marcou has repeated seven or eight times, of taking the ablative case *castigatore* for the nominative *castigator*. If, besides being a thief and a counterfeiter, and a German from beyond the Rhine, Waltzemüller was also a mere printer, Mr. Marcou's indignation against him is more than justified; but possibly there is some mistake. The evidence for this last dreadful charge is not conclusive. This evidence consists of a typographical mark at the bottom of the last page of the *Cosmographiæ Introductio*, in the shape of a rectangle, in which the following letters are arranged:

S.	D.
G.L.	N.L.
M.I.	

These letters Mr. Marcou translates: Saint Dié, Gauthier Lud, Nicolas Lud, Martinus Ilacomylus.

This interpretation is open to several objections. In the first place, it is a collection of names which tell nothing at all. There is neither verb nor object for a verb, and if, according to Latin usage, we understand a tense of the verb *sum*, we acquire the useless information that Walter Lud and Nicholas Lud and Martin Waltzemüller are, or were, at Saint Dié. Still another objection is

that Jean Basin, the genius who invented *America*, if Mr. Marcou is right, is left out of the inscription, and though we are told that Basin was modesty itself, the Luds, who were also constructively Frenchmen, would surely not have seen him wronged by a German pirate.

Weak as it is, this interpretation satisfies Mr. Marcou, and he has the right to accept it. 'To every one else the letters, read in their natural order, line by line, make the following complete statement and vindication of Waltzemüller's right as the author of the *Cosmographie Introductio*: "Sua Doctrina Germanus Librum Non Lotharingus Multiloquax Invenit:" "By his own learning the German, and not the babbling Lorrainer, made (invented) the book."

This rendering carries conviction with it. The generous and manly character of Waltzemüller would not allow him to say more than that Basin was a babbler. He makes no charge of bad faith against the Lorrainer.

Others may not be so generous, or so considerate. Why should there not rise up one day from the bones of Waltzemüller an avenger, to declare that Jean Basin was no better than he should be, that he was a Frenchman from this side of the Rhine, that he stole documents, that he was a pillager and a counterfeiter and a pirate? The person who should say these things would display very bad taste and a petty spirit, but he might seek to excuse himself by pointing out that he had said nothing against Basin which did not fall short of the unfounded charges made against Waltzemüller.

Mr. Marcou invites retaliation. His pamphlet is as barren of evidence as the article he published thirteen years ago.

His account of the French lambs and the German wolf in the Gymnasium at Saint-Dié is purely imaginary; but Waltzemüller, if a wolf, has the advantage of being in good company.

Mr. Marcou admits that Humboldt and M. d'Avezac are the two men who have studied with the greatest care the subject of the name given to the Western Continent; but he corrects M. d'Avezac for having done justice to the German from beyond the Rhine, and he thinks Humboldt made himself a little ridiculous when he traced the name America to a German source. The Italians, who do not agree with Mr. Marcou, are accused of national prejudice. Peter Martyr and Vespucci, he says, conspired together to change the name of the latter so that it might be made to agree with the *Amerrique*, which all the seamen of Europe were talking about,—so we are told,—though not one of them ever wrote it down. It was easy enough for Vespucci to carry out such a scheme, for he was a deep one (*tan fino*), the countryman of the Medici and of Machiavelli. Mr. Marcou does not add, though it is equally true, that Jacques Cartier was in like manner the countryman of Louis XI. and Olivier Le Dain.

Italian and German writers will be without excuse if they fail to profit by the lessons of impartiality and good taste and courtesy, so freely taught in the *Nouvelles Recherches*.

The three letters which follow are communicated by Gen. Geo. W. Cullum, to whom they were sent by Mr. Marcou, with liberty to publish.

MANAGUA, Dic. 2 de 1887.

SR. JULES MARCOU,

Muy Señor mio :—Oportunamente recibí la apreciable carta de V. de 23 de Julio último, y debo pedir á V. disimule mi tardanza en contestarla, pues no quería hacerlo sin dar á Vd. un informe positivo acerca de los datos que me pide, con relación á la ortografía del nombre de la Sierra de Nicaragua que yo aseguré al Sr. Peralta llamarse "*Amerrisque*," por informes tal vez inexactos de las personas de quienes los obtuve, ó por corrupción del nombre primitivo, cosa que sucede frecuentemente en estos países.

No obstante haber buscado documentos impresos ó manuscritos que se refieran á dicha Sierra, ó tribu de indios, nada he encontrado escrito, porque, como lo manifesté al Sr. Peralta, la tribu que lleva ese nombre es hoy día insignificante ; ni existe recuerdo de que haya formado antes algun grupo de poblacion considerable. Tampoco he podido obtener informes mas detallados de los que comuniqué al Sr. Peralta ; sin embargo V. puede dirigirse, por medio de la Legación nicaragüense, al Señor Don J. D. Rodriguez, que ahora se encuentra en Washington, y puede dar á V. informes exactos sobre la posición de la Sierra, las condiciones actuales de los indios que llevan el nombre de "*Amerrisque*," y sobre la ortografía del mismo por haber vivido largo tiempo en el Distrito de Chontales á que pertenece. Por lo demas creo muy probable que el nombre "*Amerrisque*" sea una corrupcion de "*Amerique*," porque son muy fundadas las observaciones que V. hace de que los nombres terminados en *ique* y en *ic* son muy comunes en la América Central, como Erandique, Fecuantique, Cacahuatique, Lolotique, poblaciones indígenas de Honduras y del Salvador, fuera del de la Sierra de Lepaterique.

El hecho de que Vespuccio se llamaba "*Albericus*" y no "*Americus*" es argumento de mucho peso, en apoyo de la suposicion de que el nombre de América es un nombre indígena. No conozco las memorias que V. ha publicado sobre este importante asunto y no dude V. que las leeré con el mayor interés, si se sirve enviármelas, lo mismo que su artículo en favor del Canal de Nicaragua, cuestion que, como V. habrá observado está próxima á resolverse en nuestro favor. Con muestras de distinguido aprecio quedo de V. muy Att° S. Servidor,

AD. CÁRDENAS.

MANAGUA, Dec. 2, 1887.

MR. JULES MARCOU,

My dear Sir :—I duly received your kind letter of the 23d July last, and beg you to excuse my delay in answering, because I did not wish to reply without giving you positive information on the facts concerning which you inquire, with regard to the orthography of the name of the range in Nicaragua, called, as I wrote to Mr. Peralta, "*Amerrisque*," from information, possibly inexact, given by the persons of whom I obtained it, or through corruption of the primitive name, a frequent occurrence in these regions.

Although I have made search for printed or manuscript documents relating to the said mountain range or tribe of Indians, I have found nothing, because, as I

explained to Mr. Peralta, the tribe which bears that name is at the present day insignificant, nor is there any recollection that it once formed a considerable population. I have failed also to find any fuller details than those which I communicated to Mr. Peralta. You may, none the less, address yourself through the Nicaraguan Legation to Mr. J. D. Rodriguez, who is now in Washington, and can furnish you with exact information as to the position of the range, the present state and condition of the Indians that bear the name of Amerisque, and concerning the orthography of the name itself. Mr. Rodriguez lived a long time in the District of Chontales, to which this name belongs.

For the rest, I think it very probable that the name *Amerisque* is a corruption of *Amerique*, because there is good ground for your observation that names ending in *ique* and *ic* are very common in Central America.

Such are Erandique, Fecuantique, Cacahuatique, Lolotique, native settlements of Honduras and of Salvador, besides the name of the Sierra de Lepaterique.

The fact that Vespuccio was called *Albericus* and not *Americus*, is an argument of much weight in support of the theory that America is an indigenous name. I am not acquainted with the memoirs which you have published on this important subject, and I shall read them, if you are kind enough to send them to me, with the greatest interest, as well as your article in favor of the Nicaragua Canal, a question which, as you will have seen, is near to being decided in our favor.

With the very highest regard, I remain,

Your most obedient servant,

AD. CÁRDENAS.

WASHINGTON, 29 de Diciembre de 1887.

PROFESOR JULES MARCOU, Cambridge, Mass.

Muy Señor mio:—Me pregunta V. en su carta de 24 del corriente mi opinion sobre si sea *Amerrique* ó *Amerisque*, la palabra aborigen que en Nicaragua designa una tribu indígena y una sierra en una parte de la cual habita esa tribu.

Mi amigo el ex-Presidente Cárdenas me dice V. haberle indicado, en carta escrita en Managua el 2 de este mismo mes, que se dirigiese á mi, que por mi larga residencia en el Distrito mineral de Chontales, podria responder satisfactoriamente á esa pregunta.

Debo decir á V. que dicha palabra pronunciada por la gente del pais, se oye *Amerisque* (con *s* entre la *i* y la *q*) y *Amerrique* (sin la *s*) de boca de los indígenas de la tribu á quienes yo he tratado. Esos indios parecen haber sido antes tribu poderosa.

A lo largo de la sierra en la llanura encuentranse lugares extensos que fueron un tiempo cementerios y que, á no dudarlo, les pertenecian. Es cierto que, al Sur, habitaban otras tribus en aquel territorio.

Ademas es fácil advertir que de muy antiguo han tenido comunicacion con la costa del Atlantico, cultivando probablemente la amistad de las que fueron belicosas tribus de los Moscos, que demoraban desde por Caratasca y el Cabo de Gracias á Dios hasta un poco al Sur de la Laguna de Perlas.

El día de hoy los *Amerisques* ó *Amerriques* son pocos sin que por el momento sepa yo dar explicación satisfactoria de tal hecho. No son por nadie hostilizados y viven á sus anchas en su sierra, pero es evidente que no pasará largo tiempo sin que desaparezcan del todo, fundiéndose quizás en otras tribus.

En Nicaragua no conozco mas lugares con nombres terminados en *ique* ó *isque*. Los que V. menciona son de la República del Salvador, y quedan á muy larga distancia de *Amerrique* ó *Amerisque*.

El Señor Thomas Belt, á quien V. se refiere, debe de haber tenido ocasión de conocer la sierra é indios de ese nombre durante un viaje que hizo por la cordillera á Matagalpa y Segovia. Yo servi á las ordenes de ese caballero en las minas de Chontales y disfruté el honor de su amistad y su confianza.

Me alegraré de recibir la Memoria que V. me ofrece: y tendré mucho gusto en contestar las preguntas que V. quiera hacerme sobre la geografía de Nicaragua.

Mientras tanto ofreciendo á V. mis respetos quedo su

Atento Servidor,

1026 17th St., N. W.

J. D. RODRIGUEZ.

WASHINGTON, Dec. 29, 1887.

PROF. JULES MARC U, Cambridge, Mass.

Dear Sir:—You ask me in your letter of the 24th inst. whether, in my opinion, *Amerrique*, or *Amerisque*, is the proper form of the native word which designates, in Nicaragua, an indigenous tribe and a mountain range, in one part of which the tribe dwells.

My friend, ex-President Cárdenas, you tell me, has advised you, in a letter written from Managua on the 2d Dec., to address yourself to me, because, from my long residence in the mining district of Chontales I could give a satisfactory answer to your inquiry.

I must inform you that the word in question, as pronounced by the people of the country, is sounded *Amerisque* (with an *s* between the *i* and the *q*), and *Amerrique* (without the *s*) in the mouths of the natives of the tribe, with whom I have conversed. Those Indians seem to have been formerly a powerful tribe. At a distance from the range, in the level ground, there are extensive spaces which were at one time cemeteries and undoubtedly belonged to these Indians.

It is certain that towards the South other tribes inhabited that region.

It is, moreover, easy to note that they kept up, from a very ancient date, a communication with the Atlantic Coast, cultivating probably friendly relations with the once warlike tribes of the Moscos, who held the country from about Caratasca and the Cape of Gracias á Dios to a little South of the Laguna de Perlas.

At the present day the *Amerisques* or *Amerriques* are few in number, but I do not feel able, at the moment, to give any sufficient reason for the fact.

They are not molested by any one and they live at their ease in their mountains, but it is evident that no long time will elapse before they disappear entirely, perhaps by absorption into other tribes.

I am not acquainted with any other places in Nicaragua which have names ending

in *ique* or *isque*. Those which you mention belong to the Republic of Salvador, and are at a very great distance from *Amerrique*, or *Amerisque*.

Mr. Thomas Belt, to whom you refer, must have had occasion to know the mountains and the Indians of that name during a journey which he made over the Cordillera to Matagalpa and Segovia. I served under the orders of that gentleman in the mines of Chontales, and enjoyed the honor of his friendship and confidence.

I shall be very glad to receive the memoir which you offer me, and I shall take much pleasure in answering the questions you may wish to put to me concerning the geography of Nicaragua.

In the meanwhile I am,

With much respect,

Your obdt. servant,

1026 17th St., N. W.

J. D. RODRIGUEZ.

WASHINGTON, 12 de Enero de 1888.

SEÑOR PROFESOR JULES MARCOU, Cambridge.

Muy Señor mio :—Hasta ahora no habia tenido el gusto de corresponder á su apreciable carta del 4. Muchísimo interés me inspira la teoria de V. sobre el origen de la palabra *América*, creyendo que si V. logra establecerla definitivamente esto enaltecerá á mi Patria que tendria el honor de haber dado nombre al Continente descubierto por Colon. Su opúsculo sobre este particular lo he leído atentamente y se lo devolveré el día de mañana, pues un amigo mio lo está leyendo hoy. Siento en verdad que no me sea posible enviarlo á Nicaragua, para que lo reproduzcan los periódicos.

Puedo asegurar á V. que es enteramente gratuita la insinuacion atribuida al Señor Peralta de que el nombre *Amerrique* ó *Amerisque* haya sido inventado por mi difunto amigo el Señor Thomas Belt. Alli han estado en Nicaragua por siglos que no nos es posible determinar la sierra y tribu de los *Amerriques*, hechos que pueden verificarse á la hora que se quiera. Por lo demas, Mr. Belt era persona seria que no se habria prestado nunca á la supercheria.

Su otro opúsculo que es relativo á la cuestion de Canal interoceánico me ha parecido tambien muy importante, y voy á enviarlo á mi pais. Su opinion sobre el Señor de Lesseps parece muy justa, y los hechos están encargándose de confirmarla.

V. debe estar impuesto de que se agita activamente el proyecto de Canal por Nicaragua y que una Comision de Ingenieros, enviada por la Compañia Concesionaria ha comenzado los trabajos de la final localizacion de la ruta.

En Nicaragua estamos preparados á dar á la empresa de Canal todo el apoyo y prestarle todas las facilidades que estén en nuestro poder.

Rindiendo á V. las gracias por la fina atencion que me ha dispensado enviándome las dos Memorias á que me he referido y asegurándole que recibiré con agrado la que tiene la bondad de anunciarme saludo á V. y me reitero su

Atento servidor,

J. D. RODRIGUEZ.

WASHINGTON, Jany. 12, 1888.

PROF. JULES MARCOU, Cambridge.

Dear Sir :—Not till now have I had the pleasure of answering your esteemed letter of the 4th.

Your theory concerning the origin of the word *America* rouses a very great interest in me, for I believe that if you succeed in establishing it definitively, the fact will exalt my native land, which would in that case have the honor of having given a name to the continent discovered by Columbus. I have read attentively your little work on the subject and shall return it to you to-morrow, for to-day a friend of mine is reading it. I am really sorry that I cannot send it to Nicaragua to have it published in the journals.

I can assure you that the insinuation, ascribed to Mr. Peralta, that the name *Amerrique* or *Amerisque* was invented by my deceased friend, Mr. Thomas Belt, is an entirely gratuitous one. The mountain range and the tribe of the *Amerriques* have existed in Nicaragua for centuries which it is beyond our power to determine; and these facts may be verified at any moment. Moreover, Mr. Belt was a serious person, who would never have lent himself to a deception.

Your other work, which relates to the question of the Interoceanic Canal, has also impressed me as a very important one, and I am going to send it to my country. Your opinion of M. de Lesseps seems to be very just, and facts are taking it upon themselves to confirm it.

You are of course informed that the project of a Canal through Nicaragua is in vigorous movement, and that an engineering party, sent by the Company which holds the concession, has begun operations for the final determination of the route. We in Nicaragua are prepared to give the undertaking all the support and all the facilities in our power.

Thanking you for your delicate attention in sending me the two memoirs of which I have spoken, and assuring you that I shall receive with pleasure the one that you are so kind as to promise me,

I beg leave to say that I am, once more.

Your Obed't Serv't,

J. D. RODRIGUEZ.

WHO FIRST SAW THE LABRADOR COAST?

BY

A. S. PACKARD.

THOSE rovers of the northern seas, the Norsemen, pushing out from the fiords of Greenland in their one-masted craft, no larger than our coasters or mackerel boats, without doubt sighted and coasted along "the Labrador" nearly five centuries before John Cabot made his first land-fall of the American Continent.

The Labrador coast was not, however, the first American land visited by the Norsemen.*

Kohl states that New England was first discovered by Biarne, in 990. It appears that Heriulf, one of the earliest colonists of Greenland, had a son, Biarne, "who, at the time his father went over from Iceland to Greenland, had been absent on a trading voyage in Norway. Returning to Iceland in 990, and finding that his father, with Eric the Red, had gone to the west, he resolved to follow him and to spend the next winter with him in Greenland.

"They boldly set sail to the south-west, but having

* We should acknowledge that, not having access to the primitive sources in which the voyages of the Norsemen to the American shores are described, we have placed our dependence on the account given by a learned German geographer, J. G. Kohl, in his *History of the Discovery of Maine*, as the most authoritative exposition of early voyages and discoveries in north-western America. Kohl's views are based on Rafn's *Antiquitates Americanæ*. (*Documentary History of the State of Maine. Collections of the Maine Historical Society. Second Series, Vol. I. 1869*).

encountered northerly storms, after many days' sail they lost their course, and when the weather cleared, they descried land, not, however, like that described to them as 'Greenland.' They saw that it was a much more southern land, and covered with forests. It not being the intention of Biarne to explore new countries, but only to find the residence of his father in Greenland, he improved a south-west wind, and turned to the north-east, and put himself on the track for Greenland. After several days' sailing, during which he discovered and sailed by other well-wooded lands lying on his left, some high and mountainous and bordered by icebergs, he reached Heriulfsnäs, the residence of his father, in Greenland. His return passage occupied nine days, and he speaks of three distinct tracts of land, along which he coasted, one of which he supposed to have been a large island."

So much for the facts taken from the Norse records and sagas. Dr. Kohl then goes on to say: "That Biarne, on this voyage, must have seen some part of the American east coast, is clear from his having been driven that way from Iceland by northerly gales. We cannot determine with any certainty what part of our coast he sighted, and what was the southern extent of his cruise. But taking into consideration all circumstances and statements of the report, it appears probable that it was part of the coast of New England, and perhaps Cape Cod, which stands far out to the east. One day and night's sailing with a favorable wind, was, in Iceland and Norway, reckoned to be about the distance of thirty German miles. Two days and 'nights,' therefore, would be sixty German miles, and this is about the distance from Cape Cod in New England to Cape Sable in Nova Scotia."

That the land first seen by Biarne was necessarily so far south as Cape Cod does not, we would venture to submit, follow from the facts we have quoted. Is it not more probable that the country was some portion of Nova Scotia, a land "as much covered with forests" as New England?

But Dr. Kohl maintains that the second land which was "well-wooded" was Nova Scotia. In his own words:

"The second country seen by Biarne must, then, probably have been Nova Scotia. The distance from Nova Scotia to Newfoundland is about three days' sail; and from Newfoundland to the southern part of Greenland, a Northman navigator, with fresh breezes, might easily sail in four days, and thus Newfoundland was probably the third country discovered by Biarne."

We should not have the hardihood to criticize Dr. Kohl's statements and conclusions, if we had not made two voyages to Labrador, in which we sailed from Cape Cod to Nova Scotia, skirted that coast, approached within a mile of Cape Ray, Newfoundland, and spent a summer on the northern shores of Belle Isle, opposite Newfoundland; and a second summer in coasting Labrador as far north as Hopedale. Hence the general appearances of the Nova Scotian, Newfoundland and Labrador coasts are, though in a slight degree, to be sure, known to us.

The records state that the southernmost land seen by Biarne was "covered by forests;" this would apply to Nova Scotia as well as to the coast of Massachusetts. It is then said that without landing, improving a south-west wind and steering north-east, "he put himself on the track for Greenland." This would be the course from Cape Cod to Nova Scotia it is true, but such a course

would also take him from the eastern end of Nova Scotia to Cape Race, Newfoundland, while from the present position of St. John's the course to the site of the Greenland Norse settlements is a northerly one.

As Kohl states, the distance from Nova Scotia to Newfoundland is about three days' sail; but the wind would have to be strong and fair all the time, for the distance from Halifax to St. John's, Newfoundland, is about 530 miles. A Viking's ship was by no means a modern cutter either in her lines or rig. We have seen in the Sogne fiord a vessel of forty or fifty tons, her hull clumsy and broad, with her single mast placed midships and carrying a square sail; her stern rather high, and her prow rising five or six feet above the bows. A Norwegian friend observed to me at the time, "There," said he, "hang the gunwale of that vessel with shields and fill her with armed men, and you would have a Viking's ship!" We doubt whether Biarne's craft could have made in "one day and night's sailing with a favorable wind," more than 138 statute miles, or thirty German miles. At such a rate it would take from five to six days to go from Halifax to St. John's, Newfoundland. The passage by a swift ocean steamer^d of the Allan Line requires from forty-two to forty-eight hours.

Passing by Newfoundland, which is well-wooded, except on the more exposed north-eastern coast, Biarne, sailing by a land "said to be high and mountainous, and bordered by icebergs, reached Heriulfsnäs." This land could have been none other than the Labrador coast from the mouth of the Straits of Belle Isle northward.

If Biarne's return passage occupied only nine days, he could not possibly have sailed from Cape Cod to

Greenland in that time. A nine days' trip from Boston to the Labrador coast at the mouth of the Strait of Belle Isle is a remarkably short one for an ordinary fishing schooner.

The distance from Boston to the Greenland coast a little north of Cape Farewell, where the southernmost Norse settlements were made, is about 2,300 miles. The southern coast of Labrador is about half way. The exact sailing distance from Thomaston, Maine, to Caribou Island, Strait of Belle Isle, Labrador, is 910 miles.

The "Nautilus," the vessel in which I first sailed to Labrador, was a staunch schooner of 140 tons. She sailed from Thomaston, Maine, June 27, and passing around Cape Breton, reached Caribou Island in ten days* (July 7th): after leaving our party on the Labrador coast, she set sail for Greenland July 9th, over nearly the same route as the Norsemen must have taken. From Captain Ranlett of the "Nautilus," I learn that he first sighted land on the coast of Greenland on the 17th, in lat. $62^{\circ} 58'$, and long. $52^{\circ} 05'$. The land first seen was about lat. $63^{\circ} 10'$, long. $50^{\circ} 45'$. This is about fifty miles south of Fiskernaes, and 25 miles north of Fredericksaab. The voyage to Greenland was thus made in about nine days, as the vessel did not reach land before the 18th. The return voyage from Godthaab to Bonne Esperance, Labrador (three miles west from Caribou Island), was made in twelve days. The "Nautilus" left Godthaab Aug. 13th, and entered the Strait of Belle Isle Aug. 24th, anchoring at Bonne Esperance Aug. 25th. Then sailing from Bonne Esperance Aug. 26th, owing to

* Rev. C. C. Carpenter writes me that he sailed in a fishing smack from Caribou Island Oct. 3d, and made the shores of Maine on the 13th.

calms and a storm she did not reach Thomaston until September 11th, a period of about fifteen days. It thus appears that the voyage from the mouth of the Penobscot river, Maine, to southern Greenland, through the Gulf of St. Lawrence, a shorter route than that of the Northmen east of Newfoundland, took nineteen days, not including the detention on the Labrador coast, while the return voyage from southern Greenland to Maine required 27 days.

In 1864 my second trip to the Labrador coast was made in a Wellfleet oysterman, a schooner of about 140 tons, built for speed, with long spars and large sails. She was probably the fastest vessel which ever visited the Labrador coast. The voyage from Boston to Mecatina Island on the Labrador coast, through the Gut of Canso, was made in seven days; it was probably the quickest voyage from Massachusetts to Labrador ever made. We ran from Provincetown to Port Mulgrave in the Gut of Canso in just forty-eight hours. The return trip from Caribou Island to Boston, a distance of about nine hundred miles, was made in nine days. The average was therefore just a hundred miles a day. How could a Norseman's clumsy craft of forty or fifty tons, with but a mainsail and a jib, outdo such sailing as that?

The Norse record says that Biarne's "return passage occupied nine days," and Kohl adds that "from Newfoundland to the southern part of Greenland a Northman navigator, with fresh breezes, might easily sail in four days. But we have seen that with fresh breezes a modern schooner, at least three times as large as a Viking's ship, required eight or nine days to run from a

point but a few miles from northern Newfoundland, *i.e.*, Belle Isle, to southern Greenland. The distance from St. John's, Newfoundland, to the Norsemen's colonies in southern Greenland is not less than 1500 miles. To perform a voyage of this length in four days would be an impossibility for a modern yacht. It is not impossible, however, that Biarne sailed from southern Newfoundland to Greenland in a period of about nine days. But a voyage from Cap Cod to Greenland by an ordinary schooner requires at least three weeks, or from twenty to thirty days at the most.

Instead then of accepting Kohl's summary of Biarne's voyage stated on p. 63 of his work, we should be inclined to believe, as the results of the expedition, that Biarne was the first European to sight the coast of Newfoundland, possibly the eastern extremity of Nova Scotia, while he also saw the mountainous, desolate, treeless, rocky coast of Labrador.

The next Norse adventurer, Leif, the son of Erik, not only sighted the Labrador coast but landed on it. To this country he gave the name of stony land, or "Helluland," a name perpetuated in an Iceland map of 1570 by Sigurd Stephanus.

The records tell us that Leif, the son of Erik the Red, the first settler in Greenland, having bought Biarne's ship in the year 1000, manned her with a crew of thirty-five men, among whom was Biarne himself, and followed Biarne's track towards the south-west. Kohl then says: "They came first to that land which Biarne had last seen, which, as I have said, was probably our Newfoundland. Here they cast anchor and went on shore, for their voyage was not the search of a son after

his father, but a decided exploring expedition. They found the country as Biarne had described it, full of ice mountains, desolate, and its shores covered with large flat stones. Leif, therefore, called it 'Helluland' (the stony land)."

Here again we should differ from Kohl as to Leif's first landfall. A south-west course would naturally carry him to the Labrador coast, while the description—"full of ice mountains, desolate, and its shores covered with large flat stones"—well describes the barren, rockbound, treeless coast of Labrador, in distinction from the much lower, wooded coast of Newfoundland. Moreover St. John's, Newfoundland, lies nearly due south of the southern extremity of Greenland.

While it is to be doubted whether Biarne ever went south of Newfoundland, we see no reason for disbelieving the conclusions of Rafn and Kohl, that the followers of Biarne, Thorwald and Thorfinn Karlsefne, became familiar with Cape Cod and wintered at Vinland. There is no reasonable doubt but that they landed on Nova Scotia and possibly left their runic inscriptions on the shores at Falmouth, Nova Scotia; there is no reason to disbelieve the records which state that they wintered farther west where no snow fell, so that the cattle found their food in the open fields and wild grapes were abundant, as they certainly are in Rhode Island and Southern Massachusetts, as compared with Maine or Nova Scotia.

Without reasonable doubt, then, Helluland of the Norse and Icelandic records is Labrador, though it is not impossible that the bare and rocky coast of north-eastern Newfoundland was by some regarded as Helluland. It would be easy for a vessel in those days to pass by the

opening into the Strait of Belle Isle, and, owing to the somewhat similar scenic features of the two lands, to confound the north-eastern extremity of Newfoundland with Labrador.

That, as some have claimed, the Norsemen ever sailed through the Strait of Belle Isle, coasted along southern Labrador and wintered at the mouth of the river St. Lawrence, is certainly not supported by the early Norse records as interpreted by Kohl.

Their vessels sailed to the seaward of Newfoundland. That they did not feel drawn to sojourn in Helluland is no wonder. Its coast presented no more attractions than Greenland, while the grapes, food and furs, with the verdure and mild winter climate of "Vinland the Good," led to one expedition after another, as late perhaps as 1347, when, according to the Icelandic annals, "a vessel, having a crew of seventeen men, sailed from Iceland to Markland."

Then came the decadence of Norse energy and seaman-ship, succeeded by the failure of the Greenland colonies, which were overpowered and extinguished by the Eskimo. A dense curtain of oblivion thicker and more impenetrable than the fogs which still wrap the regions of the north, fell upon these hyperborean lands, until, in 1497, the veil was again withdrawn by an English hand.*

Since the foregoing remarks were sent to the printer, Prof. E. N. Horsford's address at the unveiling of the statue of Leif Eriksen has appeared. He also adopts

* The voyage of Szkolney, the Pole, to the coasts of Greenland and Labrador, is stated to have been performed in 1476. See Humboldt, *Examen Critique*, ii. p. 152. (N. A. Review, July, 1838, 179.)

the general opinion that Helluland was Newfoundland, but the language of these extracts convinces us still more that Helluland was Labrador.

In the first translation printed by Prof. Horsford of the Saga of Erik the Red, it is stated in the account of the expedition of Biarne, that after leaving Iceland bound for Greenland, he missed that country and was "borne before the wind for many days, they knew not whither," finally approaching land which "was not mountainous, but covered with wood," with rising ground in many parts. Then sailing two days, and putting the ship about, leaving the land on the left side, he saw land again, "low and level, and overgrown with wood." This land was probably Newfoundland, perhaps the southern or eastern part. We would, however, contend that the next or third land which Biarne saw was Labrador, for the Saga reads: "At length they hoisted sail, and turning their prow from land, they stood out again to sea; and having sailed three days with a south-west wind, they saw land the third time." This land was high and mountainous, and covered with ice. They asked Biarne whether he wished to land here. He said, "No; for this land appears to me little inviting." Without relaxing sail, therefore, they coasted along the shore till they perceived that this was an island. They then put the ship about, with the stern towards land, and stood out again to sea with the same wind, which blowing up very strong, Biarne desired his men to shorten sail, forbidding them to carry more sail than with such a heavy wind would be safe. "When they had thus sailed four days, they saw land the fourth time." Towards evening they reached the very promontory not far north of Cape Farewell, where Heriulf, the father of Biarne dwelt.

The high, mountainous land, covered with ice, was probably Labrador near Cape Harrison, or along the coast to the northward, and a Norseman's vessel, with a strong, fair wind, could probably sail from that part of the Labrador coast to near Cape Farewell, a distance of a little over 600 miles, in four days, allowing that a viking's ship of about 60 tons could sail from 8 to 10 miles an hour under a spanking breeze. Certainly they could not have made the distance from any part of Newfoundland, which is about 900 miles, in four days.

From the account of the expedition of Leif Eriksen:

"All being now ready, they set sail, and the first land to which they came was that last seen by Biarne.

"They made direct for land, cast anchor, and put out in a boat. Having landed, they found no herbage. All above were frozen heights; and the whole space between these and the sea was occupied by bare flat rocks; whence they judged this to be a barren land. Then said Leif, 'We will not do as Biarne did, who never set foot on shore: I will give a name to this land, and will call it "Helluland," [that is, land of broad stones].'" Here again we have a much better description of Labrador than of Northeastern Newfoundland. From there Leif sailed to what he called Markland, or "Land of Woods," which may have been Southern Newfoundland, or Eastern Nova Scotia, or Cape Breton, as it is but two days' sail from the Gut of Canso to Cape Cod; and the Vinland of Leif was undoubtedly the shore lying east and south of Cape Cod.

From Mr. J. Elliot Cabot's translation of the Saga relating to Biarne's voyage

(Mass. Quart. Rev. 1849, quoted by Horsford), we take the following reference to Helluland. As before, on returning from the south, after turning the bow of his vessel from the land and sailing out to sea for three days with a W.S.W. wind, Biarne saw a third land; "but that land was high, mountainous, and covered with glaciers:" then the wind rose, and they sailed four days to Heriulfsness.

A.D. 999, Leif set sail. "First they found the land which Biarne had found last. Then sailed they to the land and cast anchor, and put off a boat and went ashore, and saw there no grass. Mickle glaciers were over all the higher parts; but it was like a plain of rock from the glaciers to the sea, and it seemed to them that the land was good for nothing. Then said Leif, 'We have not done about this land like Biarne, not to go upon it; now I will give a name to the land and call it "Helluland" [flat-stone land].'"

The north-eastern coast of Newfoundland is much lower, not mountainous, is somewhat wooded, with certainly more or less herbage on the outer islands and points. The rock formations are of later age than the Laurentian. We are familiar with the appearance of the Newfoundland side of the Strait of Belle Isle, which decidedly contrasts with that of Labrador opposite.

THE GEOGRAPHICAL EVOLUTION OF LABRADOR.

BY

A. S. PACKARD.

JUNE 24th, 1497, a year before Columbus discovered the American continent, the crew of a little vessel, the "Matthew," bound from Bristol on a voyage of discovery to ascertain the shortest line from England to Cathay, sighted land. The vessel was under the command of John Cabot, who was accompanied by his son Sebastian, a lad still under age, perhaps but nineteen or twenty years old. Sebastian kept the ship's log; but the narratives of this, as well as his other voyages, have been lost.

The land was called "Prima vista," and it was believed by Biddle and Humboldt, as well as Kohl and others, that this region which the Cabots first saw was the coast of Labrador in 56° or 58° north latitude. While the narrative of this momentous voyage has been lost, a map of the world ascribed to Sebastian Cabot, and engraved in 1549, contained an inscription, of which we will copy an extract translated in Hakluyt's *Voyages* (iii. 27).

In the yeere of our Lord 1497, Iohn Cabot, a Venetian, and his sonne Sebastian (with an English fleet set out from Bristoll) discovered that land which no man before that time had attempted, on the 24 of Iune about fve of the clocke early in the morning. This land he called Prima vista, that is to say, First scene, because as I suppose it was that part whereof they had the first sight from sea. That Island which lieth out before the land, he called the Island of S. Iohn vpon this occasion, as I thinke, because it was discovered vpon the day of Iohn the Baptist.

The inhabitants of this Island vse to weare beast skinnes, and haue them in as great estimation as we haue our finest garments. In their warres they vse bowes, arrowes, pikes, darts, woodden clubs and slings. The soile is barren in some places, and yeildeth little fruit, but it is full of white beares, and stagges farre greater than ours." p. 27.

Kohl seems fully persuaded that the landfall of John Cabot was Labrador, because of the presence of white bears.* But if the inscription and map are genuine, the description of the inhabitants of the island, both men and beasts, would better apply to those of the eastern or southern coast of Newfoundland. The human beings were more probably red Indians than Eskimo. On the Labrador coast the soil is "barren" in all places, while the "stagges far greater than ours" may have been the moose, which then abounded and still exists in Newfoundland, and must have been rare, if it ever lived, on the coast of Labrador. Moreover the "white bears" spoken of as being so abundant may have been a white variety of the black bear, or perhaps the "barren ground" pale bear of Sir John Richardson may have been frequent in Newfoundland. It appears to have been of smaller size than the brown bear of Europe, because in *Parmenius'* account of Newfoundland, published in 1583, it is said, "Beares also appear about the fishers' stage of the countrey, and are sometimes killed, but they seeme to be white, as I conjectured by their skinnes, and somewhat lesse than ours" (*Hakluyt*).

On the other hand, the true white or polar bear may have frequently visited the eastern coast of Newfoundland, as it formerly abounded on the Labrador coast.

Moreover, nothing is said in the inscription of any

* "This agrees much better with the coast of Labrador than with that of Newfoundland, to which the white bears very seldom, if ever, come down." p. 133.

ice, which at that date, the 24th of June, so abounds from the Straits of Belle Isle northward to the polar regions. Besides, if we contrast the account of this voyage of the two Cabots in 1497, with that of the younger Cabot the following year, it seems plain that John Cabot's "Prima vista" was Newfoundland rather than Labrador.*

In May, 1498, Sebastian Cabot, under license of Henry VII., in command of two ships, manned with three hundred mariners and volunteers, again sailed to the north-west in search of Cathay. Kohl says: "We have no certain information regarding his route. But he appears to have directed his course again to the country which he had seen the year before on the voyage with his father, our present Labrador." Farther on he remarks: "The Portuguese Galvano, also one of the original and contemporary authorities on Cabot's voyage of 1498, says, that having reached 60° north latitude, he and his men found the air very cold, and great islands of ice, and from thence putting about and finding the land to turn eastward, they trended along by it, to see if it passed on the other side. Then they sailed back again to the south."

From this and other statements by Humboldt and D'Avezac, Kohl concludes that "Cabot in 1498, without doubt, sailed along the coast of Labrador and the western shores of Davis' Strait. Finally, after a struggle with the ice off the Cumberland peninsula in 67½° north latitude, where he probably lost a number of his men, he abandoned any further advance. He then retraced

* According to John Dean, LL.D., in the *Critical History of America*, vol. iii., John Cabot's landfall was the northern part of Cape Breton Island.

his course southward along the coast of Labrador, and probably came to anchor in some bay on the eastern coast of Newfoundland, where he rested his men and repaired the damage done to his vessels by the Arctic ice. His vessel was probably the forerunner of the fleet of English, Portuguese, Basque, French and Spanish fishermen which in the next two centuries visited those shores; opening to the old world a source of revenue more available than the fabled wealth of Cathay.

Still, dreams of the Indies led Cabot on southward, past Newfoundland, past Nova Scotia, along the New England shores, and probably southward near Cape Hatteras, with the hope of finding a direct passage to the East.

Although on their return from their first voyage of 1497, the Cabots believed that the land they had discovered was some part of Asia, to them must be given the credit of beholding the American continent before Columbus; while, with little or no doubt Sebastian Cabot beheld in July, 1498, the mainland of Labrador, for, says Hakluyt, "Columbus first saw the firme lande, August 1, 1498."*

English seamen, then, were the first to reveal to a world which had forgotten the deeds of the Norsemen the north-eastern shores of our continent, and to carry to Europe the news of the wealth of life in the seas of Newfoundland and the Bay of St. Lawrence.

The Cabots were of Italian origin, though Sebastian was born in Bristol. The English did not immediately follow up their discoveries, for the next explorer who ventured near if not within sight of the Labrador coast

* Kohl, p. 131, foot note.

was a Portuguese, Cortereal, who was commissioned by Emanuel the Great of Portugal, the same enterprising monarch who had previously sent out Vasco de Gama on his voyage around the Cape of Good Hope.

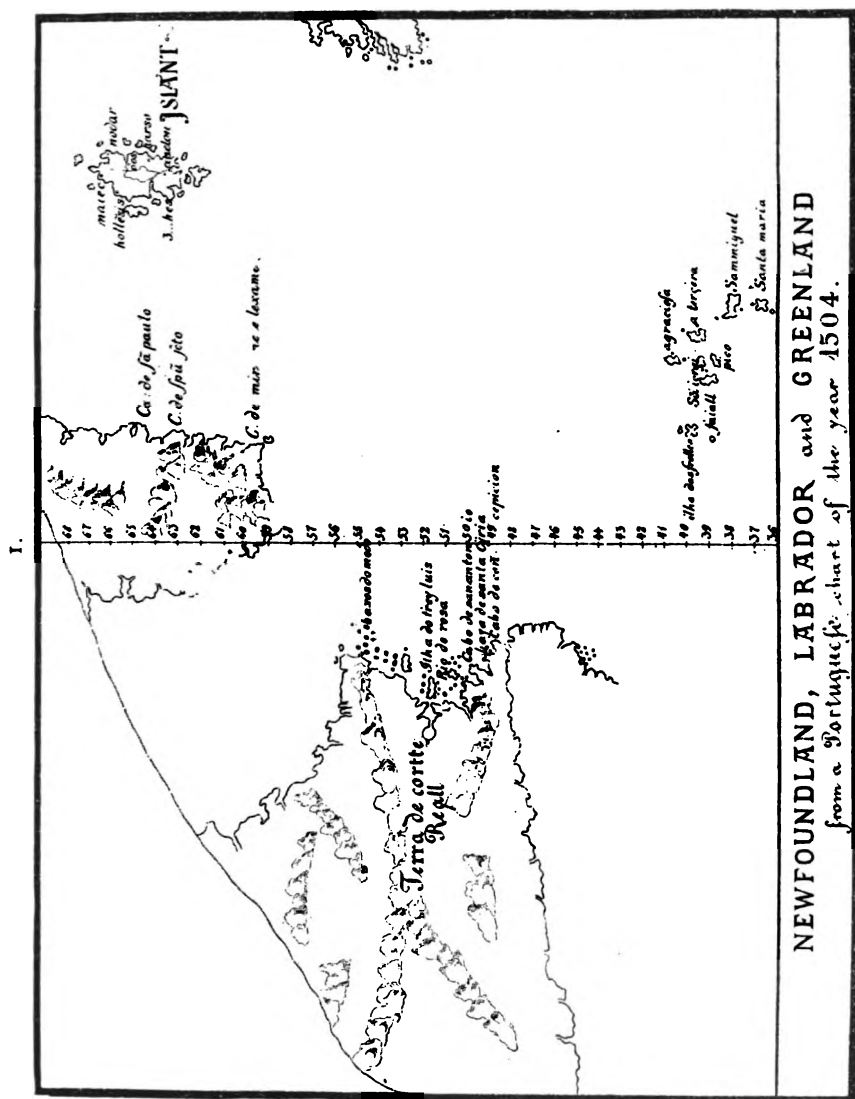
Cortereal sailed from Lisbon in the year 1500. His landfall was Newfoundland near Cape Race, or northward at Conception Bay. From this point he sailed northward, and probably discovered Greenland. He then came to the mouth of a river called by him "Rio nevado," which is supposed to have been near the latitude of Hudson's Strait. Here he is said to have been stopped by ice. He then sailed southward, resting on the east coast of Newfoundland, before returning to Lisbon.

The next year Cortereal returned to Newfoundland. He was unable to reach the northern regions on account of the ice, which was more abundant than the year before. On his return his vessel and all aboard foundered, the companion ship reaching Lisbon. The land Cortereal visited was mapped on a Portuguese Chart in 1504, and was called *Terra de Cortte Reall*." Kohl claims that "the configuration of the coasts, and the names written upon them prove, that parts of Newfoundland and of our present Labrador are the regions intended."

As yet the knowledge of Labrador was in embryo, Labrador and Newfoundland being a nebulous mass. In a Portuguese map of 1520, nevertheless, we have the name of "Lavrador," which however was applied to Greenland, while the Labrador coast and Newfoundland were confounded, and given the name "Bacalhaos."

But yet it is to the Portuguese that we owe the name

of Labrador. Kohl tells us that "King Emanuel, having heard of the high trees growing in the northern



countries, and having seen the aborigines, who appeared so well qualified for labor, thought he had found a new slave-coast like that which he owned in Africa; and dreamed of the tall masts which he would cut, and the men-of-war which he would build, from the forests of the country of the Cortereals."

The word Labrador is a Portuguese and Spanish word for laborer. On a photograph of a Mexican field-hand or peon, ploughing in a field which we lately purchased in Mexico, is written "Labrador." In a recent book on Cuba the author thus speaks of a wealthy Cuban planter: "He is, by his own account, a *Hijo de Labrador* (laborer's son) from Alava, in the Basque Provinces.* Cortereal's land was thus the "laborer's land," whence it was hoped slave laborers might be exported to the Portuguese colonies.

The Portuguese also, as is well known, applied to Newfoundland the name Bacalhaos which means dried codfish or stockfish.

As the result of Cortereal's voyage the Portuguese fishermen through the rest of the 16th century habitually visited the shores and banks of Newfoundland, and undoubtedly were more or less familiar with the Labrador coast, for Scandinavian authors report their presence on the Greenland coast. (Kohl, p. 190.)

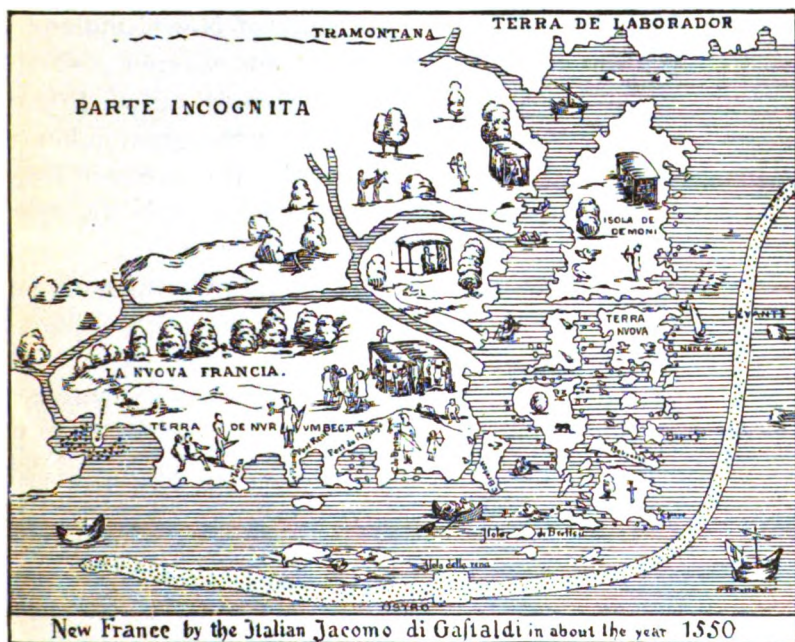
In a foot-note to p. 197 of his "Pioneers of France in the New World" Mr. Parkman remarks: Labrador — *Laboratoris Terra*—is so-called from the circumstance that Cortereal in the year 1500 stole thence a cargo of Indians for slaves. That the "Indians" were captured on the Labrador coast, however, appears to be an inexact statement. There were probably then no red Indians or timber on the Labrador coast, but Cortereal must have entrapped them in Newfoundland or some place southward. Kohl [p. 169] tells us that "these Aborigines, captured according to the custom of the explorers of that day, are described, by an eye-witness who saw

* A. Gallenga. *The Pearl of the Antilles*, p. 100. 1874.

them in Lisbon, as tall, well built, and admirably fit for labor. We infer from this statement, that they were not Esquimaux from the coast of Labrador, but Indians of the Micmac tribe, inhabitants of Newfoundland and Nova Scotia." The editor of Kohl's work adds a quotation from the Venetian Pasqualigo, who says: "His serene majesty contemplates deriving great advantage from the country not only on account of the timber, of which he has occasion, but of the inhabitants, who are admirably calculated for labor, and are the best slaves I have ever seen."

The path opened by Sebastian Cabot was not only trod by Portuguese, but the Spanish,* Basques, French,

II.



(Bretons and Normans), and English, frequented the rich fishing banks of Newfoundland, and with little

* "The voyage of Estevan Gomez produced in Spain the same effect which those of the Cabots, of Cortereal, and of the men from Normandy and Brittany had produced in England, Portugal, and France—it conducted the Spaniards to the north-western fisheries." (Henry Hudson, by Ashler, Hakluyt Soc. p. xcix.)

doubt visited the Gulf of St. Lawrence and the southern coast of Labrador. Their discoveries were perhaps recorded in Gastaldi's map.

Labrador first became clearly differentiated from Newfoundland by Jacques Cartier. To him we owe the discovery of the Strait of Belle Isle; of Belle Isle, the Isola De' Demoni of earlier voyages; of Chateau Bay and other points on the Gulf coast of Labrador.

Sailing from St. Malo the 20th of April, 1534, he arrived May 10th on the eastern coast of Newfoundland, near Cape Buonavista. From this cape, Cartier pushed northward until he came to what is now called Fogo Island, which was one of the resorts of the great auk, or "penguin" of the early explorers. But we will let Cartier describe the scene which met his eyes in his own words translated by Hakluyt:

From "The first Relation of Iaques Carthier of S. Malo, of the new land called New France, newly discovered in the yere of our Lord 1534."

"Vpon the 21 of May the winde being in the West, we hoised saile, and sailed toward North and by East from the Cape of Buona Vista vntil we came to the Island of Birds, which was enuironed about with a banke of ice but broken and crackt: notwithstanding the sayd banke, our two boats went thither to take in some birds, whereof there is such plenty, that vnlesse a man did see them, he would thinke it an incredible thing: for albeit the Island (which containeth about a league in circuit) be so full of them, that they seeme to have bene brought thither, and sowed for the nonce, yet are there an hundred folde as many hovering about it as within; some of the which are as big as iayes, blacke and white, with beaks like vnto crows: they lie alwayes vpon the sea; they cannot flie very high, because their wings are so little, and no bigger than halfe ones hand, yet do they flie as swiftly as any birds of the aire leuell to the water; they are also exceeding fat; we named them Aporath. In lesse then halfe an houre we filled two boats full of them, as if they had bene with stones: so that besides them which we did eat fresh, eury ship did powder and salt fife or sixe barreles full of them.

"Besides these, there is another kinde of birds which houer in the aire, and ouer the sea, lesser then the others; and these doe all gather themselves together in the Island, and put themselves vnder the wings of other birds that are greater:

these are named Godetz. There are also of another sort but bigger, and white, which bite even as dogs. those we named Margaulx.

"And albeit the sayd Island be 14 leagues from the maine land, notwithstanding beares come swimming thither to eat of the sayd birds: and our men found one there as great as any cow, and as white as any swan, who in their presence leapt into the sea; and vpon Whitsun mvnday (following our voyage toward the land) we met her by the way, swimming toward land as swiftly as we could saile. So soone as we saw her, we persued her with our boats, and by maine strength tooke her, whose flesh was as good to be eaten as the flesh of a calfe of two yeres olde."

Cartier then sailed north, entered the Strait of Belle Isle, anchoring at Blanc Sablon, still a settlement east of Bradore Bay.

"White Sand [Blanch Sablon] is a road in the which there is no place guarded from the south, nor south-east. But towards south-south-west from the saide road there are two Ilands, one of the which is called Brest Island, and the other the Iland of Birds, in which there is great store of Godetz, and crows with red beaks and red feete: they make their nests in holes vnder the ground euen as conies."

The great French navigator harbored in the ancient port of Brest, near these islands, the "Iland of Birds," being the present Parroquet island, fifteen miles eastward of the mouth of Esquimaux river.

Our voyager then coasted along these forbidding shores to St. James river, where he first saw the natives: "they weare their haire tied on the top like a wreath of hay." . . . they paint themselves with certain Roan colors; their boates are made of the barke of birch trees, with the which they fish and take great store of seales, and as farre as we could vnderstand since our comming thither, that is not their habitation, but they come from the maine land out of hotter countries, to catch the saide seals and other necessities for their liuing." These red men must have been the Mountaineer Indians, which still come down to the coast from the warmer interior each summer to fish for seal. Cartier makes no mention of the Eskimo, who would undoubtedly have been encountered if their roving bands

had been living on the coast from Chateau Bay to the Seven Isles, which he so carefully explored.

This coast appeared to Cartier so disagreeable, unproductive, and barren, that he exclaimed, "It ought to be the country which God had given to Cain." So he crossed the Strait of Belle Isle, sailed over to Newfoundland, coasted that island to Cape Anguille, which he reached on the 24th of June. From there he sailed over to the Magdalen islands, to the Bird rocks (Isles aux Margaulx), thence to Prince Edward's Island, thence to Miramichi, afterward to Gaspé Bay, and coasted Anticosti, crossing over again to near and within sight of the Mingan Islands. Not on this voyage discovering the river St. Lawrence, he finally turned homewards, coasting along the Labrador shore, touching at Cape Tiennot, now called Cape Montjoli. Thence he returned to France through the Strait of Belle Isle.

The next year Cartier returned, sailing again through the Strait of Belle Isle; and, coasting along the southern shores of Labrador, discovered the River St. Lawrence.

On his third voyage, Cartier entered the Gulf of St. Lawrence, passing in between Newfoundland and Cape Breton, thus for the first time demonstrating that Newfoundland was an island and not a part of the continent.

The next step in the geographical evolution of Labrador is seen in Mercator's great map of 1569. Kohl tells us that for the compilation of this map Mercator had collected many printed and manuscript maps and charts, and many reports of voyages of discovery. "But," says Kohl, "the best portion of Mercator's work, and a real and valuable improvement upon all former maps, is his delineation of the large peninsula of Labrador, lying

south-west of Greenland. On all former maps, that region was ill-shapen and most incorrectly drawn. But here, under the name of 'Terra Corterealis,' it receives its proper shape, with a full and just development, which had not been given to it on any map prior to 1569. He makes its eastern coast run south-east and north-west, as it really does from about 53° to 60° N. In the north he plainly shows the narrow entrance of Hudson's Strait, and at the west of it a large gulf, called by him 'Golfam de Merosro.' This remarkable gulf may be an indication of either Hudson's Bay or only the Bay of Ungava. I think that the latter was meant; first, because the 'Gulf of Merosro' has the longitude of the mouth of the River St. Lawrence, which is also the longitude of the Bay of Ungava; second, because the said gulf is represented as closed in the west. The western coast of the Bay of Ungava runs high up to the north, where Hudson's Strait is often filled with ice. This may have led the unknown discoverers, the informants of Mercator, to suppose that it was closed in the west. If they had looked round Cape Wolstenholm into Hudson's Bay, they would have perceived a broad bay and open water before them.

"Mercator does not indicate, so far as I know, the sources from which he derived these remarkable improvements for his chart, which were not known by Homem in 1558, and of which there are only slight indications on the Cabot map of 1544. He adopts the Portuguese names for his 'Terra Corterealis,' namely, 'Golfam de Merosro,' 'Y. dus Demonios,' 'Cabo Marco,' 'Ilha da Fortuna,' 'Baia dus Medaus,' 'Rio de Tormenta,' 'Ylhas de Caravillo,' 'Baia de Malvas,' etc. Some of

the names are not new, but had been long known, though not always put in the same position. We know of no official Portuguese exploring expedition made to these regions between the time of Homem (1558) and Mercator (1569); and therefore the suggestions of Dr. Asher, for the solution of this problem, have a high degree of probability. He says :* 'The Portuguese fishermen continued their surveys of the northern coasts,' commenced by Gaspar Cortereal in 1500, 'most likely for no other purpose than to discover advantageous fisheries. They seem to have advanced slowly, step by step, first along the shores of Newfoundland, then up to the mouth of Hudson's Strait, then through that Strait, and at last into Hudson's Bay,' or, as I think, into Ungava Bay. 'With a certain number of ancient maps, ranging from 1529 to 1570 before us, we can trace this progress step by step. In 1544,' the time of Cabot's map, 'the Portuguese seem not yet to have reached the mouth of the Strait; and in 1570,' or, as I think, 1569, the date of our Mercator's map,† 'they have reached the bay,' Hudson's, or at least Ungava Bay, 'We can, therefore, state with the greatest certainty, that Hudson's Bay,' Hudson's Strait as far as Ungava Bay, . . . 'had been discovered before the publication of Ortelius's atlas, which took place in 1570,' or, better, before the publication of Mercator's chart, which took place in 1569. 'But we are not equally certain, that the discovery falls within the years 1558 to 1570,' or, better, 1569, 'because we have only the negative evidence of Diego Homem's

* See G. M. Asher's *Henry Hudson*, Introduction, p. xcvi., London, 1860.

† Dr. Asher does not mention Mercator's map of 1569. He had before him the map of Ortelius of 1570, who was only a follower and copyist of Mercator, but adopted his views.

chart to support the latter assertion. The fact itself is, however, probable enough."

To the English navigators of the 16th and 17th centuries succeeding Cartier, we owe the next step in our knowledge of the geography of the Labrador peninsula.

In 1577 Master Martin Frobisher sighted the coast of Northern Labrador, which he called "Frisland," using a word which frequently appears in the early charts. The point he first sighted was probably north of 58°, for after coasting four days along the coast for perhaps a distance of nearly two hundred miles, a voyage of eight days, between the 8th and 16th of July, would carry him to Frobisher's Strait. Moreover his description of the coast applies well to the northern extremity of Labrador beyond Hopedale and Okkak.

The narrative reads thus:

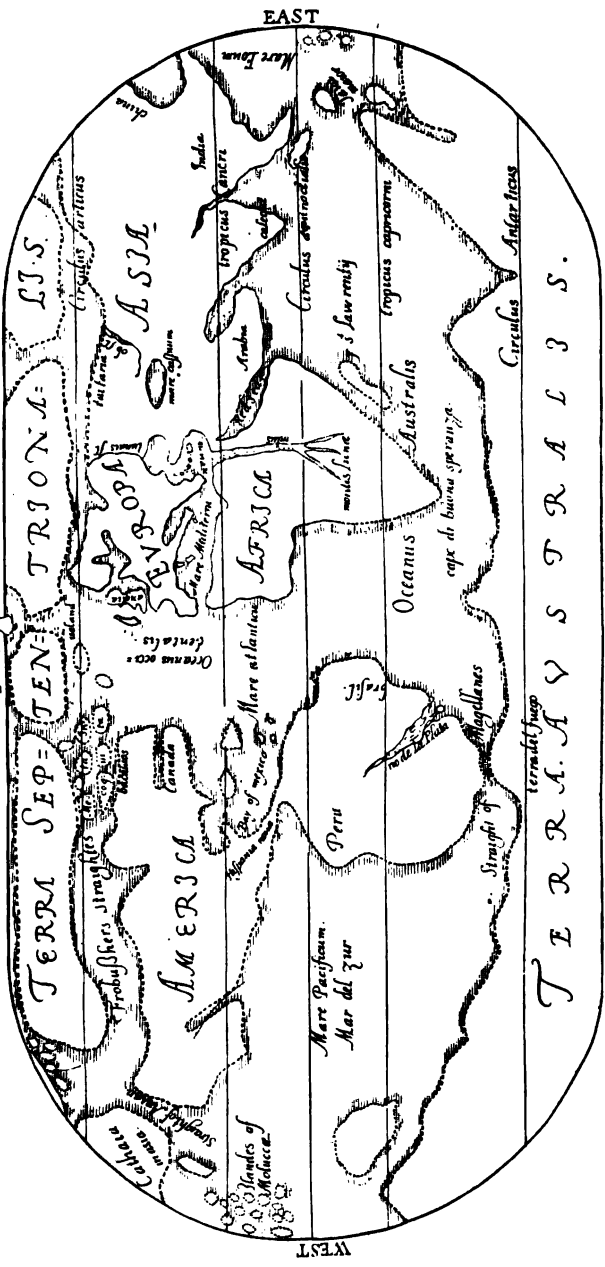
"The 4. of Iuly we came within the making of Frisland. From this shoare 10. or 12. leagues, we met great Islands of yce, of halfe a mile, some more, some lesse in compasse, shewing above the sea, 30. or 40. fathoms, and as we supposed fast on ground, where with our lead we could scarce sound the bottom for depth.

"Here in place of odoriferous and fragrant smels of sweete gums, and pleasant notes of muscally birdes, which other Countreys in more temperate Zones do yeeld, wee tasted the most boisterous Boreal blasts mixt with snow and haile, in the moneths of Iune and Iuly, nothing inferior to our vntemperate winter; a sudden alteration, and especially in a place or Parallele, where the Pole is not eleuate above 61. degrees; at which height other Countreys more to the North, yea vnto 70. degrees, shew themselves more temperate than this doth. All along this coast yce lieth, as a continuall bulwarke, and so defendeth the Country, that those that would land there, incur great danger. Our Generall 3. days together attempted with the ship boate to haue gone on shoare, which for that without great danger he could not accomplish, he deferred it vntil a more convenient time. All along the coast lie very high mountains couered with snow except in such places, where through the steepeenes of the mountains of force it must needs fall. Foure days coasting along this land, we found no signe of habitation. Little birds, which we judged to have lost the shoare, by reason of thicke fogges which that Country is much subiect vnto, came flying into our ships, which causeth us to suppose, that the Country is both more tollerable, and also habitable within, than the outward shoare maketh shew or signification.

IV.

NORTH

Poleus Arcticus



EAST

WEST

Poleus Antarcticus

SOUTH

MAP SHOWING FROBISHER'S DISCOVERIES.

"From hence we departed the eight of Iuly; and the 16. of the same, we came with the making of land, which land our Generall the yeere before had named the Queenes foreland, being an Island as we iudge, lying neere the supposed continent with America; and on the other side, opposite to the same, one other Island called Halles Isle, after the name of the Master of the ship, neere adiacent to the firm land, supposed Continent with Asia," (p. 57.)¹

In Rundall* we find it stated that "Frobisher now left to himself, altered his course, and stood to the S.W.; and, seventeen days afterwards, other land, judged to be LABRADOR, was sighted in latitude 62° 2' N." (p. 11). In this latitude, however, lies Meta Incognita.

"The great cape seen [by John Davis] on the 31st was designated, it is stated, WARWICK'S FORELAND; and the southern promontory, across the gulf, CAPE CHIDLEY.² On this Fox observes: "*Davis and he* [Waymouth, a later navigator] *did, I conceive, light* Hudson into his Streights." The modern authority before cited expresses a similar opinion; and there is no reason to doubt the fact.

"From Cape Chidley a southerly course was taken to seek the two vessels that were expected to be at the fishing ground; and on the 10th, in latitude 56° 40', they had a *frisking gale* at west-north-west." On the 12th, in about latitude 54° 32', an island was fallen in with which was named Darcie's Island. Here five deer were seen, and it was hoped some of them might be killed, but on a party landing, the whole herd, after being twice coursed about the island, 'took the sea and swamme towards ilands distant from that three leagues. They swam faster than the boat could be pulled, and so escaped. It was represented that one of them 'was as bigge as a good prety cowe, and very fat, their feet as big as oxen feet.'

"The 13th, in seeking a harbour, the vessel struck on a rock and received a leak: which however, was mended the following day, in latitude 54°, 'in a storm not very outrageous at noone.' On the 15th, in latitude 52° 40', being disappointed in their expectations of finding the *Elizabeth* and *Sunshine*, or of finding any token of those vessels having been in the vicinity, and there being but little wood, with only half a hogshead of fresh water on board, it was determined to shape the course homeward for England. This was accordingly done; and they arrived on the 15th of September in Dartmouth, 'giving thanks to God' for their safe arrival." p. 49.

¹ "The second voyage of Master Martin Frobisher, 1577, written by Master Dionise Settle. Hakluyt, vol. III., New Edition, London, 1810."

* Narratives of Voyages towards the North-west in search of a passage to Cathay and India. 1496-1631. By Thomas Rundall, Esq., London, Hakluyt Society, 1849. 8°, pp. 259.

² "The worshippfull M. John Chidley, of Chidley, in the countie of Deuon, esquire," was apparently chief promoter of an expedition which sailed Anno 1589, for "the Province of Arauco on the coast of Chili, by the streight of Magellan." Of this expedition M. Chidley was also the General. Hakluyt. iv. 357.

But it is to Davis, after whom Davis Strait was named, that we owe the most exact knowledge of the Labrador coast, until modern times. The following extracts contain all that we can find regarding his exploration of the Labrador coast.

Davis, in the *Moonshine*, left Greenland in latitude $66^{\circ} 33'$ Aug. 1st, 1586. "She crossed the strait in nearly a due westerly direction. The 14th of August she was near Cape Walsingham, in latitude $66^{\circ} 19'$, on the American side. It was too late for anything more than a summary search along the coast. The rest of the month, and the first days of September, were spent in that search. Besides the already known openings, namely, Cumberland Strait, Frobisher's Strait, and Hudson's Strait, two more openings were found, *Davis' Inlet* in 56° , and *Ivutoke Inlet* in $54^{\circ} 30'$. Davis' men had to cross the Atlantic in his miserable craft, and he performed the voyage through the equinoctial gales in little more than three weeks. He reached England again in the beginning of October, 1586." (Henry Hudson, cxv.)

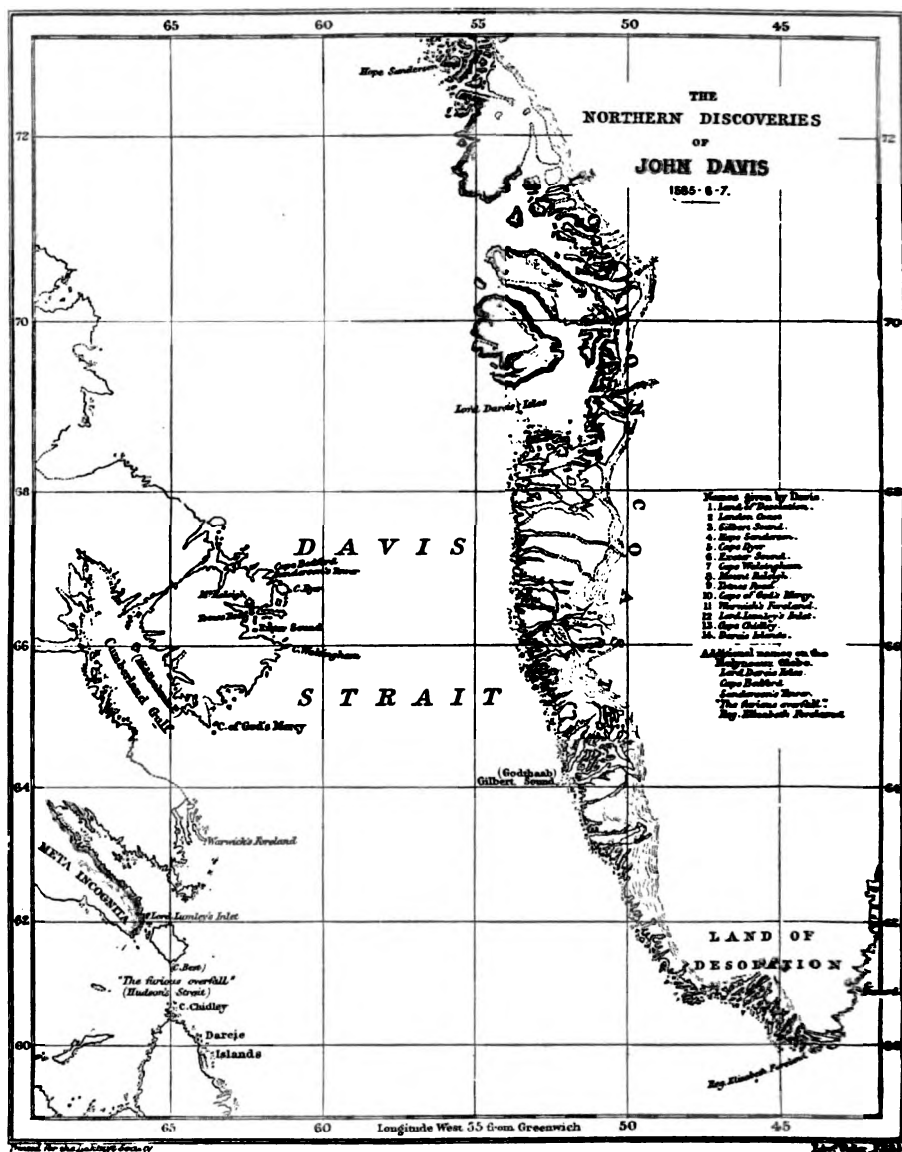
Davis was followed by Waymouth in 1602. According to Rundall :

"From the 5th to the 14th of July, the navigator appears to have been ranging along the coast of Labrador, where, on the 10th, variation $22^{\circ} 10'$ W., he saw many islands. On the 15th he was in latitude $55^{\circ} 31'$, variation $17^{\circ} 15'$ W.; and the day following saw 'a very pleasant low land, all islands,' in latitude N. 55° , variation $18^{\circ} 12'$ W. On the 17th he entered, and sailed up, an inlet for thirty leagues, in sanguine hope of having found the desired passage; but he was doomed to disappointment. In this inlet, which has been identified with Sleeper's Bay on Davis' Inlet, Waymouth encountered his last peril, and escaped in safety. The fly-boats were assailed by a furious storm, which terminated in a whirlwind of extreme violence, that rendered them, for a while, completely unmanageable; and though very strongly built, they took in so much water, for want of spar decks, that they narrowly escaped being swamped. As soon as the weather cleared up, the course was shaped for England." p. 68.

The Labrador coast was next seen by Master John Knight, who sailed April 18, 1606, from Gravesend in the *Hopewell*.

"After a most tedious and uninteresting passage, the vessel arrived off some broken land, in latitude $56^{\circ} 25'$ N.: much ice driving to the southward. The wind was fresh and the commander made fast to a piece of ice; but falling calm, he endeavored to row in between the masses. This was an unfortunate attempt. The

v.



MAP SHOWING DAVIS' DISCOVERIES, HAKLUYT SOCIETY.

weather became thick and foggy, and a furious storm arose on June 14 : they were driven about in the ice. Lost sight of land till the 19th, when it is described as being seen again, rising like eight islands in latitude $56^{\circ} 48' N.$, variation $25^{\circ} W.$ The vessel was then taken into a cove, and made fast by hawsers laid out on shore. On June 26th. Capt. Knight, his mate and three hands set out, well armed, to explore a large island. They disappeared, having probably been killed by the natives.

"On the night of the 29th, 'they were attacked by savages, who set on them furiously with bows and arrows ; and at one time succeeded in obtaining possession of the shallop. However, the eight mariners, with a fierce dog, showed a resolute front, and the assailants, upward of fifty in number, were finally driven off. The savages are represented to have been 'very little people, tawny colored, thin or no beards, and flat-nosed.' They are also described as being 'man-eaters ;' but for this imputation there appears to be no warrant, except in the imagination of the parties on whom the attack was made."

On the 4th of July, the vessel was in great danger of foundering, the craft leaking badly.

"Shaping their course towards Newfoundland, with a strong current in their favour, they made Fogo on the 23d of July. At that place they were most hospitably entertained. Having refitted, they left on the 22d of August full of grateful feelings towards their generous friends ; and arrived at Dartmouth on the 24th of December." pp. 75. 76.

In 1610 Henry Hudson discovered the Strait which bears his name, his discoveries being recorded in the accompanying map, copied from the volume on Henry Hudson, published by the Hakluyt Society.

In the narrative of the Voyage of *Sir Thomas Button* (1612-13) we find the following reference to Cape Chidley.

On this part of the voyage, the following remarks are reported, by Fox, to have been made by *Abacuk Prickett*. "He saith, they came not through the maine channell of *Fretum Hudson*, nor thorow *Lumley's Inlet* ; but through into the *Mure Hyperborum* betwixt those Ilands first discovered and named Chidley's Cape by Captain Davis, and the North part of *America*, called by the Spaniards, who never saw the same, *Cape Labrador*, but it is meet by the N. E. point of *America*, where was contention among them, some maintaining (against others) that them Ilands were the *Resolution*," etc. p. 89.

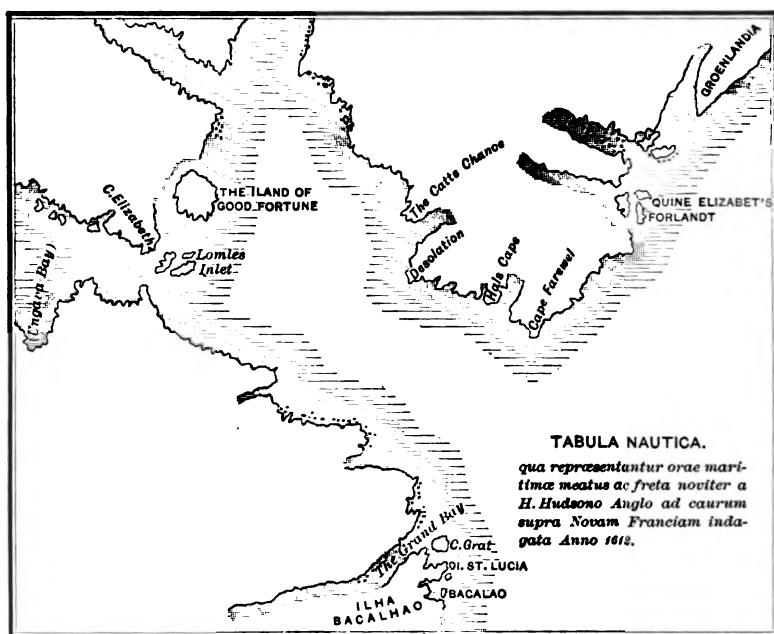
Captain Gibbons in 1614, appears to have been detained for some months on the Labrador coast.

Of the result of the voyage, all that is known, says Asher, is thus laconically communicated by Master Fox : "Little," he says, "is to be writ to any pur-

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pose, for that hee was put by the mouth of *Fretum Hudson*, and with the ice driven into a bay called by his company GIBBONS HIS HOLE, in latitude about 57° upon the N. E. part of *Stinemia*, where he laid twenty weeks fast amongst the ice, in danger to have been spoyled, or never to have got away, so as the time being lost, hee was inforced to returne." The bay in which Gibbons was caught, is supposed to have been that now called NAIN, on the coast of Labrador. p. 95. (*Arctic Voyages* p. 205.)

VI.



MAP OF HENRY HUDSON'S DISCOVERIES—HAKLUYT SOCIETY.

A summary mention of the early voyages we also find in the records of the Hakluyt Society:

"*Hudson's Strait* had been discovered by Sebastian Cabot in 1498. The Portuguese had sailed through it and had become acquainted with part of Hudson's Bay between 1558 and 1569. In 1577 Frobisher had by chance entered the strait. In 1602 Weymouth had sailed nearly a hundred leagues into it, from Hatton's Headland to the neighborhood of Hope's Advance Bay.

"The whole east coast of North America from 38° north to the mouth of Hudson's Strait, had been surveyed by Sebastian Cabot in 1498, and part of it before,

in 1497, by his father and him. Others had rediscovered various parts. Thus the east of Newfoundland had been explored by Cortereal in 1501; the south coast, by some fishers from Normandy and Brittany in 1504 and 1508. The mouth of the St. Lawrence had also been visited by Cortereal and by these French mariners. The river, nearly up to the lakes, and all the surrounding country, had been thoroughly explored by Jacques Cartier in 1534 and 1535, and afterwards by Roberval and Cartier.

"The *Sandbanks near the mouth of the St. Lawrence*, and the fishing stations along the Newfoundland coast, were frequented by the English, Portuguese, French, and Spaniards." H. Hudson, Hakluyt Soc. cxliv.

After Henry Hudson's voyage, no further explorations were made of the Labrador coast, so far as we can ascertain, until the time of rear-Admiral Bayfield, of the British Navy, who, during the years 1815 to 1827, surveyed and mapped this coast as well as the Gulf of St. Lawrence and Newfoundland. His researches are embodied in the English Admiralty charts, from which the maps of the Labrador peninsula in use up to about 1880 are copied. Of the advances lately made by British and Moravian surveys mention has previously been made.

To most readers the Labrador coast is still a *Meta Incognita*, an *Ultima Thule*, a land of mystery, shrouded by fog and gloom. The ordinary knowledge of it is as vague and indefinite as in the times of Cabot. The period when accurate charts of this intricate coast with its tens of thousands of islands, skiers and ledges will be made, seems far distant. Local pilots and fishermen from Newfoundland, Nova Scotia, and at times from the United States, with an occasional Newfoundland or Canadian steamer ply over regularly beaten routes, but owing to the lack of commercial interest in these barren, almost deserted shores, the coast will for years still remain well nigh beyond the pale of modern interests and thoughts.

In time the Indian and Eskimo will be a people dead and forgotten. The Moravian settlements will be abandoned. Already, owing to the decrease in the cod fishery, famine and want are slowly but surely reducing by removal and death the numbers of the lingering white population, and the coast will be still more desolate and lonely than now.

And yet this coast stands like a protecting, guardian wall between the frozen north, and the more temperate, inhabitable regions south and west. Its unexplored bays and rivers will always remain full of interest to our adventurous yachtsmen, as well as to the naturalist and traveller.

TIERRA DEL FUEGO AND THE SAHARA.

[A Communication addressed to the President of the American Geographical Society by MR. E. REUEL SMITH, of New York.]

THE interesting notes which follow relate to the climate and physical conditions of Tierra del Fuego and the Sahara, and are taken, for the most part, from Molina's *Saggio sulla Storia Naturale del Chili*, and from the work of Gen. Daumas, *Le Grand Désert*. They were submitted in a more extended form to President Daly, as illustrative of the passages in his Annual Address which treat of those widely separated regions, and he has now, with the writer's consent, kindly furnished them for publication.

In a note, p. 33, lib. I., of the Italian edition (1782), Molina says:

“The opinion concerning the excessive cold of the southern extremity of America is so strongly established that it would seem like temerity to wish to contradict it.

“Nevertheless, allow me to propound certain doubts in regard to a point so universally admitted. Commodore Byron, at the very time that he is comparing the temperature of the Magellanic summer to the mid-winter climate of England, describes the region as follows: ‘All that point (Sandy) is covered with wood; we found springs of fresh water, and the trees and verdure offered for a distance of four or five miles a very agreeable prospect.

“‘Beyond the point the country is level and appar-

ently fertile; the ground was covered with flowers, which filled the air with a delicious perfume. We found a prodigious quantity of seeds of different kinds. . . . In the midst of this smiling prairie enamelled with an infinity of flowers appeared many hundreds of birds . . of brilliant plumage. . . . We passed for twelve miles along the borders of this beautiful country, etc. . . The banks of the Sedger are clothed with large and superb trees, and I doubt if any taller can be found. Among them are some of more than eight feet in diameter, which is more than twenty-four feet in circumference.

“Pepper and cinnamon (Wintereana) are here very common. These fine trees, despite the rigors of the climate, were enlivened by the presence of innumerable flocks of parrots and other birds of magnificent plumage. . . .

“From this port (Famine) to Cape Forward (about four leagues) the country is as pleasing as possible . . in places covered with flowers in no way inferior to those cultivated in our gardens, either in variety, color, or fragrance.” *Voy. of Hawkesworth, Tom. I., Chap. 4.*

The foregoing refers to the northern shore of the Straits . . . and Molina continues:

“This description is true, and conforms to the accounts of other voyagers in these parts. But could so exuberant and so smiling a vegetation ever exist in a climate so excessively cold? Would the parrot, so fond of warmth, voluntarily remain in a clime condemned to a perpetual winter?

“If, then, the summer is so rigid as to be compared to the midwinter of England, what idea must we form of the Magellanic winters?

“But the cinnamon is found in abundance not only on the northern shore of the Straits, but, according to Cook in his Second Voyage, in Tierra del Fuego, where (though unable to resist the winters of England) it thrives prodigiously under the open sky. . . I do not question the truth of the misfortune that befel Banks and his crew in Tierra del Fuego, but this isolated fact is not sufficient to establish a theory. . . The crew of the *Concepcion* passed an entire winter there in 1766 without any such disaster.” And he concludes :

“The Emperor Julian spoke of the climate of France, then wooded and uncultivated, in the same terms now used to describe the cold of the Magellanic regions.”

I have not attempted (says Mr. Smith) to verify the quotations given by Molina, but in Capt. Cook’s Second Voyage, under date 29 Dec., 1774, I find :

“We steered for Le Maire’s Strait, between Tierra del Fuego and Staten Island. . . Here the land sloped down from the hills into long level points covered with tall forests, and no snow was to be seen except on the distant western mountains. We entered the Straits the next morning, but were becalmed. . . Success Bay lay open to our eyes, and the country about it looked so rich and fertile that we heartily wished to make some stay there.”

Elsewhere Molina speaks of his personal experience :

“I myself in June, 1768, navigated those waters as far as latitude 61° S., without finding the slightest indication of freezing, and, though it snowed with much frequency, the cold did not exceed what we are accustomed to feel in Bologna during the winter season.”

Mr. Smith’s recollections of the voyage round Cape

Horn confirm this report; and his inquiries during a visit to Algeria in 1855 led him to entertain the opinion that the Great Desert was not a waste of sand.

Arabs who had frequently crossed to the country of the Blacks, assured him that for several months in the year the Sahara abounded with pasture, which disappeared only in the summer heats. The sandy tracts, it was even then well known, formed an exception to the general character of the soil, which possessed every element of fertility but water.

Mr. Smith quotes from Gen. Daumas (*Le Grand Désert*, Paris, 1856), several statements to the same effect, and makes an abstract of the itinerary of a Tuareg slave-dealer to the Kingdom of Haoussa, as given in detail to Gen. Daumas. The journey, begun in September, lasted, with intervals of delay for slave-hunting, until the following March, the actual time on the road being set down at fifty-four days. Pasture was found almost every day, and there were but nine days when water was not to be had. Sand is mentioned on eleven of the travelling days. The party constantly met with encampments of tribes with their camels, asses, sheep and goats. Game, such as gazelles, hares, rabbits, partridges, etc., abounded in many places; and in the mountains, which the caravan had frequently to cross, there were many trees, and the rain sometimes fell in torrents. There were towns along the route with groves of date palms, and gardens full of fine fruits and vegetables.

GEOGRAPHICAL NOTES.

THE NAME OF AMERICA.—This Society has received from Mr. T. H. Lambert, who has in person declared himself to be the author of the work, a thick pamphlet, which bears on the cover the following words :

“Abridged Popular Edition.

“Discovery of the Origin of the Name of America.—The most illustrious Aboriginal National Name of the Continent, First written on Maps, by the Cartographer of Charles V. [from an Address by the Author, before the American Geographical Society].

“ ‘The native Amaracan roads,’ says the Baron de Humboldt, ‘are the most useful and stupendous works ever executed by man.’

NEW YORK, 1888.”

The title-page of this pamphlet reads : “Discovery of the Origin of the Name of America by Thomas de St. Bris”; and the work is copyrighted, presumably by the author, since there is no publisher’s name, by Thomas Byrne.

Mr. Thomas de St. Bris and Mr. T. H. Lambert, and, possibly, Mr. Byrne, are, therefore, one and the same person ; but when Mr. de St. Bris affirms that his work is “from an Address by the Author before the American Geographical Society,” he mistakes his own identity.

Nothing is known of an address by a person of that name.

Mr. T. H. Lambert did read before this Society, in the year 1883, a short paper on the "Origin of the Name of America," and there is a family likeness between this paper and the larger work, of which Mr. de St. Bris is the author, though Mr. Lambert claims it for his own. If Mr. de St. Bris really wrote the work, Mr. Lambert has every reason to be satisfied; and if, on the other hand, Mr. Lambert is the author, Mr. de St. Bris is to be congratulated.

To correct the author's errors would be to rewrite his book, but one or two points must be noticed.

The passage printed in italics on the cover of Mr. de St. Bris's, or Mr. Lambert's, work, makes Humboldt speak of the *Amaracan* roads in an absolute way, very unusual with him. It ought to have been shown where and how Humboldt had used the words attributed to him. The quotation was made, no doubt, from memory, but memory is sometimes at fault, and it is always a satisfaction to the reader to have the reference.

There is in the *Vues des Cordilleres*, p. 294, a sentence somewhat like the one given by Mr. Thomas de St. Bris. It reads: "*Le grand chemin de l'Inca, un des ouvrages les plus utiles, et en même temps des plus gigantesques, que les hommes aient exécuté, est encore assez bien conservé entre Chulucanas, Guamani et Sagique;*" and seems to mean in English: "*The great road of the Inca, one of the most useful and at the same time one of the most gigantic works constructed by man, is still in fairly good preservation between Chulucanas, Guamani and Sagique.*"

This passage, as far as the word *exéculté*, is correctly given by Prescott (Peru, Vol. I., p. 67, *note*), with a free translation, which has become still freer in passing through the mind of Mr. Thomas de St. Bris.

The "Discovery of the Origin of the Name of America," is intended to prove that *Amaraca* or *Amarca* was the native name of what has been called the Peruvian Empire, invaded and conquered by the Spaniards in the 16th century, and that the word *America* is but a modification of this aboriginal name, which is found, almost unchanged, in Caxamarca, Cundinamarca, Pultimarca, and other South American names; and this word *Amaraca* or *Amarca*, is said to mean various things, more or less directly related to the sun-worship of the Peruvians. It follows, naturally, that Mr. Thomas de St. Bris rejects the historical account of the word *America*. It is for him to choose what he will accept; but those who look over his pamphlet must feel that his theory supplies nothing. His etymologies are less clear than they might be, and, according to Mr. Clements R. Markham, a competent Quichua scholar, the word *marca* in Peruvian names means simply a *tower* or *house* (Travels of Pedro de Cieza de Leon, Pt. I., p. 271, *note*. Hakluyt Society Publications).

It is, perhaps, better for most men to refrain from entering on the flowery and also thorny paths of etymology; and, with or without etymology, the subject treated by Mr. Thomas de St. Bris and by some other writers has no great importance in itself.

It is a matter of indifference whether the name *America* comes from the East or from the West, and the sufficient rule for students of history is that a credible

contemporary statement of fact is to be preferred to even the most ingenious theory. If this principle is set aside, records cease to have any value; as Archbishop Whately showed when he succeeded in proving, for a purpose, that there never had been any such person as Napoleon Bonaparte.

COLONASIA.—Mr. Arturo Baldasano y Topete proposes, in the *Boletín* of the Madrid Geographical Society for Jan.—March, 1888, that the American nations unite in declaring that, from the year 1892, the name of the Western Continent shall be Colonasia. This word will, he believes, perpetuate the glory of Columbus and at the same time recall the fact that the Admiral believed he had reached in the West the far-away shores of Asia.

Nothing could be more appropriate than such a declaration, solemnly made by the nations of the New World; but would the Old World abide by the declaration? Other difficulties suggest themselves.

If it is just and right to name the Western Continent after Columbus, it is equally just and right to name Mexico after Cortés, and Brazil after Pinzon or Cabral, and the Amazon after Orellana, and the Mississippi after de Soto, and England after Cæsar, or Hengist and Horsa. Once entered on a road so full of delight, there will be no stopping at any one point, and the energies of mankind will be wholly absorbed in the pleasing but profitless task of rebaptizing the world. Considering, moreover, the stolid indifference of most men to the ideal fitness of the names they are in the habit of using, it may be better to postpone the proposed declaration to the year 1992, by which time the older and duller generation

of Americans will have passed away and left a free field to Mr. Baldasano and the Colonasiatics.

DISCOVERY AND EXPLORATION ON THE NORTH-WEST COAST OF AMERICA.—In Appendix No. 7 to the Report of the U. S. Coast and Geodetic Survey for 1886, Prof. George Davidson makes an examination of some of the early voyages to the N.W. coast of America, between the years 1539 and 1603.

He says in his Introduction: "I think I have been able to reconcile many of the discrepancies of the old Spanish, English, American, and French navigators. . . . While giving to these great men (Cook and Vancouver) the fullest credit for surveys unparalleled before or since (when all the attendant circumstances are considered), I cannot withhold my admiration for the indomitable courage and perseverance of the old Spanish navigators who, in small, ill-conditioned and ill-supplied vessels, with crews nearly destroyed by scurvy, fought their way to the wildest parts of the Alaskan coast, almost regardless of season."

With his personal, familiar knowledge of the Pacific shores, Prof. Davidson has found it possible to locate Ulloa, to track Cabrillo and Ferrelo in their discoveries in mid-winter, to place Drake under Cape Ferrelo and Point Reyes, and to fix with certainty the most of Vizcaino's positions.

The identifications made are marked on the chart (Scale 1:5,000,000), which shows the West Coast of America between 19° and 41° N. latitude.

Several errors, natural enough in a work printed without the advantage of the author's supervision, have

been corrected in a sheet issued by the U. S. Coast and Geodetic Survey, under date of May 22, 1888.

ONE DANGER OF THE SEAS.—The Pilot Chart of the North Atlantic, for June, issued by the Hydrographic Office at Washington, mentions four derelict vessels, which have been drifting about for several months. The Italian barque "Vincenzo Perrotta," abandoned Sept. 18, 1887, in lat. 36° N., lon. 54° W., has been reported eleven times, the last report being of April 27, 1888, in lat. $24^{\circ} 31'$ N., lon. $64^{\circ} 50'$ W. The Norwegian barque "Telemach," abandoned Oct. 13, 1887, in lat. 37° N., lon. 39° W., has been met with six times, the last being March 25, in lat. $29^{\circ} 32'$ N., lon. $32^{\circ} 33'$ W.

The American schooner "D. & E. Kelley," abandoned Dec. 19, 1887, was reported thirteen times in twenty-two days, and, it may be supposed, has since gone down.

Another American schooner, the "Edward G. Taulane," was abandoned Feby. 17, 1888, in lat. $35^{\circ} 18'$ N., lon. $73^{\circ} 10'$ W., and drifted 250 miles to the E.N.E. in five days, before she was met by the British steamer "Albano," and set on fire.

This did not destroy her, for she has been sighted twice since that time, the last report, of April 19, placing her in lat. $33^{\circ} 07'$ N., lon. $64^{\circ} 40'$ W.

It needs no very lively imagination to picture the ruin that may be wrought by these unguided masses, driven by wind and wave across the ocean highways.

THE GENERAL ADOPTION OF THE GREGORIAN CALENDAR.—The *Compte Rendu* of the Paris Geographical

Society for April 6, has a communication on this subject from Father Tondini di Quarenghi.

Four calendars are in daily use in Europe alone, the Gregorian, the Julian, the Mahometan and the Israelitish. The Julian year is twelve days behind the Gregorian, and these can be made to agree, for the affairs of civil life, by a simple process of addition or subtraction; but to adjust the dates of Church festivals, such as Easter, is a matter of nice calculation.

The Mahometan year is lunar, and counts, sometimes 354, sometimes 355 days: and New Year's Day travels through the seasons. In 1873, for instance, the Mussulman New Year corresponded to Feby. 17, while in 1888 it will fall on the 7th of September. The day begins, for Mahometans, at sunset, and there is no spot on the globe where the sun sets precisely at the same moment two days in succession; and the passage of the moon from one meridian to another is less rapid than the passage of the sun.

These and other details make it extremely difficult to compare the dates of the Mahometan calendar with those of the Gregorian; but this difficulty may be accepted as practically constant. Reform of the Mussulman system is not to be expected, so long as there are Mahometans.

The relation of the Calendar to the prime meridian leads Father Tondini to some reflections on the action of the International Congress at Washington, in 1884. He approves the attitude of M. Janssen, the French delegate, who opposed the adoption of the meridian of Greenwich, and he thinks material interests unworthy of consideration in such a question, without seeming to

remember that a prime meridian is desired principally for the advantage of material interests.

Father Tondini has lived a long time in England, and he is persuaded that the Anglo-Saxons are not less ready than other men to sacrifice their interests for the sake of a grand idea. Such an idea he now offers to the surprised meditation of Anglo-Saxons and others. He proposes to harmonize conflicting claims and arguments by adopting as a prime meridian that of the Holy Sepulchre ($32^{\circ} 52' 52''$ E. from Paris).

CARON'S VOYAGE TO TIMBUKTU.—An account of this memorable expedition was given by Lieut. Caron at a special meeting of the Paris Geographical Society, on the 9th of April.

The gunboat *Niger*, in which the voyage was made, was 60 ft. in length by not quite 10 ft. in width, with a draught of a little over 3 feet. There was stowage room for two months' provisions for the crew of 9 men, but the only space for the fuel was on deck, and wood had to be cut every few hours. With her two propellers the *Niger* made about five knots. She was armed with a revolving cannon, but was without protection against a hostile fire.

It was on the 1st of July, 1887, that the gunboat left Bamako. It was the time when the river begins to rise. For the first 125 miles the water was so low and the channel was so much obstructed by sandbanks that the steamer had to feel her way. The river was about two miles wide, and the vessel was sometimes in danger from the squalls that came up, accompanied by thunder and rain. From Sansandig to Diafarabé, a distance of sev-

enty miles, the river was very wide and shallow, though at full flood the water is from 16 to 26 feet deep.

Seventy miles beyond Diafarabé is Mopti, the first town in the country subject to Tidiani, the Toucouleur chief, who has carved out for himself within the last twenty years a kingdom of about 50,000 square miles. The Toucouleurs are fanatical Mussulmans, dreaded throughout Senegambia and the region of the Upper Niger for their energy and daring. The name they bear is neither English nor French, but, according to Reclus, a corruption of the ancient name of the country, the Tukurol, mentioned by Cadamosto.

Two days before leaving Diafarabé, Lieut. Caron sent a messenger to announce his coming to Tidiani. A tremendous storm, in the night of July 14, nearly put an end to the expedition.

The water swept everything fore and aft, and when the wind went down, with daylight, the men were so jaded that they got the vessel under way almost mechanically, and "without wishing each other good-morning." They arrived at Mopti on the 17th. In this part of the course the river was three miles wide, with low banks and scenery like that of the Nile.

The people live by catching and curing fish, which they sell in the back country. At Mopti the natives seemed to be afraid to hold communication with the Frenchmen. To reassure them the gunboat was anchored in the middle of the river, and it was not till the 21st that a messenger arrived from Tidiani, with a letter inviting Lieut. Caron to Bandiagara, thirty miles to the E. of Mopti, a journey to be made on horse-back. On the 24th, having had an attack of fever on the way,

Lieut. Caron reached Tidiani's palace, a great building in the Arab style. After breaking his fast, in company with 300 retainers, who sit down at the chief's table every day, the French officer was introduced to the ruler, who was very courteous but evidently distrustful. For more than a week, there were daily audiences with the chief, who put off, on one pretext or another, the conclusion of a treaty with the French; Lieut. Caron and his companion, Dr. Jouenne, being meanwhile kept under surveillance, though well treated. The 31st July was fixed on for the signature of the treaty and the departure of the Frenchmen, but at the interview with the Europeans that morning, Tidiani suddenly declared that Lieut. Caron should not go to Timbuktu.

"What!" he said, "if I receive you in my house, does that give you the right to enter my harem? Timbuktu belongs to me, and the Tuaregs are my women. You shall not go to see them without my permission."

The French officer met this explosion with firmness and temper, and, after some discussion, Tidiani exclaimed:

"Well, go then! but I will give you neither provisions, nor escort, nor horses."

Returned to Mopti, the voyagers rested for two days, and started again on the 6th of August. Fifty miles beyond Mopti the Niger enters Lake Dheboé, through which it flows, issuing on the northern side and continuing its course in a north-easterly direction. The lake is about twenty-five miles long from east to west, and about eleven wide in its broadest part.

The scarcity of fuel made itself felt on leaving Mopti, and was the cause of ceaseless anxiety during the remain-

der of the voyage. It was found also that Tidiani had sent on orders already that no one should have anything to do with the Frenchmen, and the population, though principally composed of Pouhls and Bambaras, was kept in good discipline by the Toucouleur chiefs. Notwithstanding the extremities to which this system of non-intercourse reduced his men, Lieut. Caron took nothing for which he did not leave an equivalent, and would not allow a shot to be fired ; and to this prudent conduct he attributes, and with reason, the safe return of the party.

Beyond Lake Dheboé, the Niger is called the Bara-Issa. Between the lake and Safay, which is ninety miles below, the river is alternately from two to three miles wide, and then suddenly narrowed to less than 200 feet, with sharp curves between banks forty or fifty feet in height. One of these narrow passages is more than thirty miles long and the water in it was forty feet deep. The natives, armed with muskets, lined the banks above, but allowed the steamer to pass unmolested. In all this region there were fields of rice, millet, maize, tobacco and cotton, and broad pasture-lands covered with grasses ten feet high, in the midst of which were seen herds of cattle and flocks of sheep.

At Safay the gunboat left the territory of Tidiani. From this point to Timbuktu, a distance of seventy-five miles, the Niger is from a mile to two and a half miles wide, and the water in the channel is deep. Near Timbuktu the stream widens into a kind of shallow estuary, and there is hardly water enough, even in time of flood, to allow a boat of any considerable size to reach the city. Kábara, the port nearer to Timbuktu, is accessible towards the end of September, but Lieut. Caron,

arriving on the 18th of August, had to anchor his gun-boat at Koriumé, the outer port, six miles from the mysterious African city, now at last brought within reach of the outer world.

On the 20th, the *Niger* started on her return to Bamako.

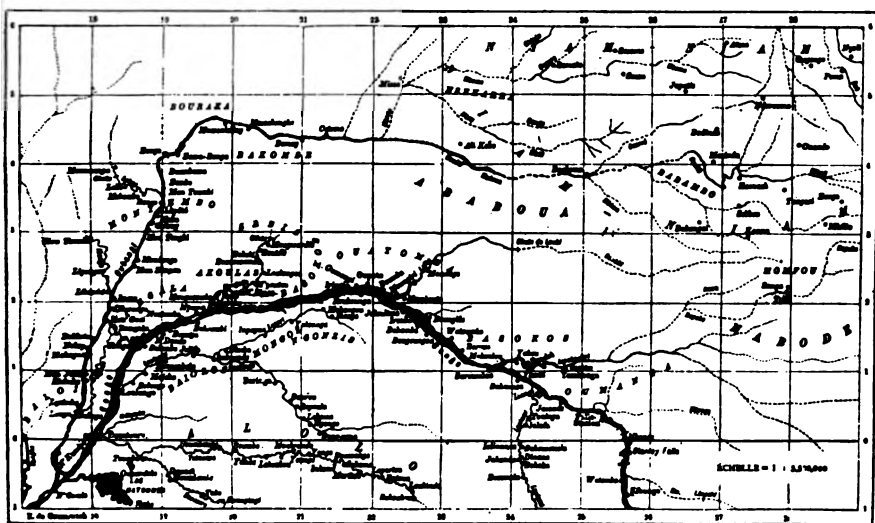
THE UBANGI-WELLE.—*Le Mouvement Géographique*, of April 22, publishes the map herewith reproduced and a brief account of Capt. Van Gèle's recent expedition, which appears to have established the identity of the Ubangi and the Welle rivers. The history of these rivers is also summarized.

Schweinfurth discovered the Welle in 1870, and supposed it to be the Shari, which flows into Lake Tchad.

Stanley, on the contrary, descending the Congo in 1877, and coming to the mouth of the Aruwimi, believed that he had found the Welle, and this belief was only confirmed by his ascent of the Aruwimi itself, in 1883, as far as the rapids of Yambuya.

The Ubangi was discovered in 1884 by Capt. Hanssens and Lieut. Van Gèle. It was ascended, the same year, as far as $1^{\circ} 25'$ N. Lat., by Mr. George Grenfell, who subsequently pushed his exploration as far as $4^{\circ} 20'$. In October, 1886, Capt. Van Gèle and Lieut. Liénart, charged by the government of the Congo State with the solution of the problem presented by this river, failed to get beyond the Zongo rapids ($4^{\circ} 20'$ N. Lat.); and a second attempt by way of the Itimbiri was also unsuccessful. The third expedition left Equator Station, Oct. 26, 1887, in the steamer *En Avant*, reached the Zongo rapids, Nov. 21, and spent twenty days in pass-

ing these and five other rapids. Beyond the last, the Mokuangaï, the river was half a mile wide, with an average depth of thirteen or fourteen feet, and for thirty-one miles above the Mokuangaï rapids, it flowed from the north-east, then made a curve, and for the rest of its course, as far as the steamer went, came directly from the east. Through the 170 miles of this eastern por-



The Upper Congo and the Welle-Oubangi Basin.

tion the river is called Dua. The progress of the *En Avant* was stopped at $22^{\circ} 55'$ E. Lon., by her striking on a rock. Lieut. Liénart, who landed with a force to protect the cargo which was sent on shore, was attacked by the natives, who showed, though repulsed, such a determined attitude of hostility that Capt. Van Gèle decided to return.

The extreme point reached by Junker, who descended the Welle river towards the west, was $22^{\circ} 55'$, and the

latitude was $4^{\circ} 20'$ N., precisely that of the Ubangi at the point where Van Gèle's exploration ceased.

In each case the direction of the river was east and west; and it is hardly possible to doubt that the two streams are one and the same.

Capt. Van Gèle reports that between the third and the fifth rapids the country is beautiful, and the native race a fine one. One tribe, the Bakombé, is distinguished by an abundance of hair arranged in tresses, which are often six feet long—so long, in fact, that Lieut. Liénart says the women frequently tie them in loops, through which the arms are passed; a fashion which might be adopted, with modifications, in more northern climes.

The country seemed to be fertile, and provisions abounded, so that the rice taken on board at Equator Station was left untouched.

The people are great workers in iron, but make little use of the ivory of which they have great store.

Mr. Kaltbrunner, in the *Revue Française*, expresses some doubt of the conclusions, so positively stated in *Le Mouvement Géographique*, and the sketch map, used by Dr. Junker in his address before the Hamburg Geographical Society, on the 28th of April last, gives to the Welle a north-westerly direction from the point where the Russian traveller's exploration ceased, as reported; for the point is not indicated on the map.

AN INTERNATIONAL SYSTEM OF BUOYS.—The Lisbon Geographical Society, by a circular letter dated April 20, 1888, calls upon all scientific associations to interest themselves in bringing about an International Conven-

tion to study and propose a general and uniform system of buoys, light-ships, and other aids to navigation. There is already in existence an international code of signals, but there is none of buoys and light-ships. As things are now, navigators are obliged to make a special study of each port in each country, except in France, where the regulations are uniform for all the coasts and harbors. This want of system multiplies the chances of disaster. A vessel touching at a port in France, finds a buoy of a particular color to show that it must be passed to starboard. A buoy of the same color in a Spanish port must be passed on the larboard side ; and these changes of meaning for the same signal do not even follow each other in order from country to country.

The Lisbon Society, though it is the first organization to take up this important subject, recognizes the priority of the idea in the remarks of Mr. Thomas Stevenson and Admiral Bedford before the conference held at the *Trinity House*, London, on the 11th of April, 1883.

The action proposed is that the Geographical Societies and other scientific bodies bring the matter before the respective Governments ; and it will undoubtedly be considered in the Convention referred to in the Washington letter, elsewhere printed.

THE SPACE LEFT FOR COLONIZATION.—M. Ganeval shows, by a table printed in the *Bulletin* of the Lyons Geographical Society for Jany.—March, 1888, that the world is not yet overcrowded.

Allowing five acres to each inhabitant, he finds that Europe has room for an additional population of

115,000,000, Africa for 1,336,000,000, Asia for 1,402,000,000, Oceania for 515,000,000, and America for 2,009,000,000. The frozen regions of Asia and Europe are deducted from the available space, but Arctic America is somewhat hastily assumed to be fit for cultivation. M. Ganeval's calculations are open to correction on some points, and they do not take into account the forces that work against multiplication, but they suggest the probability that no one nation has yet done its best with the resources of its own soil.

THE CONTINENTAL CENTRE.—According to Gen. A. von Tillo in *Petermanns Mittheilungen*, Bd. 34, IV., the Continental centre is that point which lies farthest from the ocean, and to fix upon this point may be a matter of importance. He finds, for the five continents, the following centres (Longitude from Greenwich) :

For Asia :	Lat.	Lon.
Between Kuldja and Aravidsi, in the Thian-Shan Mts.		43° N. 85° E.
For Africa :		
In the Niam-Niam Country.		4° N. 27° E.
For North America :		
In the Black Hills, Dakota.		45° N. 102° W.
For South America :		
The Source of the Paraguay.		14° S. 56° W.
For Australia :		
North of Amadeus Lake, Alexandra Land.		23° S. 132° E.

The smallest distance to the ocean is :

From the Asiatic point	1,616 miles.
“ “ African point	1,118 “
“ “ North American point	1,056 “
“ “ South American point	1,056 “
“ “ Australian point	590 “

The mean distance of the five is about 1,087 miles ; and while the Asiatic centre exceeds this distance by 529 miles, the Australian falls short of it by 497 miles. The Asiatic and North American centres are at almost the same distance from the Equator and are separated from each other by 187° of longitude.

There is no great difference in the distances from point to point. These are : between the Asiatic and the African about 70° , on the Equator ; between the North and the South American about 73° ; between the South American and the African 82° ; and between the North American and the Asiatic 92° .

BOSNIA AND HERZEGOVINA.—Mr. E. B. Freeman, H. B. M. Consul at Bosna-Serai, gives in the *Scottish Geographical Magazine* for May a short description of these new Austrian provinces. They belong to the *Karst* district, which extends from the Kraïna, on the former Austrian frontier, to the southernmost point of Greece.

By the *Karst* is understood a rocky formation with only a slight depth of soil, mostly bare of woods. Throughout Bosnia the valleys and river-beds are cut between wall-like rocks, sometimes 1000 to 1200 feet high. Caves and caverns are common, and in these

whole rivers disappear, to rise again many miles away; and in some parts of the country these rivers form periodical lakes. The Bosna, Vrbas, Sanna, and Unna rivers all gush out from the earth as large streams. The valleys often widen out into plains of considerable extent. The river systems are divided by plateaux, sometimes 3000 feet in height; and in Nova-Bazar twice this height is reached.

Though Bosnia belongs to the Karst formation, the mountains are still covered with magnificent forests. The great water-shed of the region extends from Serrajevo by Tarcin to Sebenico in Dalmatia, separating the rivers that flow northwards to the Save from the Neretva, which empties into the Adriatic. South of this water-shed lies the Herzegovina, now a barren and rocky land, but once covered with forests. The formation is white limestone, and the climate is like that of Italy or Southern Spain. Grapes and olives ripen to perfection, while in Bosnia there is an intensely cold winter with deep snow, and a short, hot summer. The area of Bosnia is over 16,000 square miles, and that of Herzegovina about 4,000. Of the whole surface, 9,500 miles are covered with forests, 7,000 are arable land, and 4,400 are barren rock. The population was, in 1885, 1,336,000, of which number less than 200,000 belonged to Herzegovina. The Mussulmans were 493,000, the Greek Christians 571,000, and the Roman Catholics 266,000; and there were 5,800 Jews, descendants of those exiled from Spain 400 years ago. The Spanish language is still spoken by these Bosnian Jews.

A Contribution to American Thalassography—Three Cruises of the United States Coast and Geodetic Survey Steamer "Blake" in the Gulf of Mexico, in the Caribbean Sea, and along the Atlantic Coast of the United States, from 1877 to 1880, by Alexander Agassiz, in Two Volumes.

Boston and New York, 1888.

The cruises of the "Blake" for deep-sea soundings were made in the winters of 1877-78 and 1878-79, and in the summer of 1880. In the first expedition, under Lieut. Commander Sigsbee, U. S. N., the dredging operations were extended from Key West to Havana, and westward along the N. coast of Cuba, from Key West to the Tortugas, to the N. extremity of the Yucatan Bank, to Alacran Reef, to Cape Catoche across to Cape San Antonio, back to Key West, then to the Tortugas and northward to the mouth of the Mississippi. About 1100 miles of lines were made, taking the shortest distances from point to point.

In the second season the "Blake" was in charge of Commander J. R. Bartlett, U.S.N. The cruise was from Washington along the Greater Antilles and through the Windward Islands as far south as the hundred-fathom line off Trinidad, and the operations were brought to a close at Barbados. Commander Bartlett was again in charge in 1880, when the vessel left Newport in June for the north-eastern edge of George's Shoal, where the first line was run from the hundred-fathom line to a depth of nearly 1,250 fathoms. The second line, which extended to about 1,400 fathoms, was made to the south-east, off Montauk Point.

From Newport a line of dredgings was run from the

hundred-fathom line normal to the coast, across the Gulf Stream, to about 120 miles E. of Charleston.

The greatest depth not being much over 350 fathoms, Commander Bartlett returned towards shore, and ran a line in a N.E. direction parallel to the coast in the trough of the Gulf Stream. The depth did not increase till the latitude of Cape Hatteras was nearly reached, when in a short distance there was a drop from 352 to 1,386 fathoms. A fifth line was run normal to this northern slope of the Gulf Stream plateau, to a depth of 1,632 fathoms, and a sixth to the northward of Cape Hatteras to a depth of 1,047 fathoms. A seventh line to the E. off Cape May, was extended from the hundred-fathom line to 1,200 fathoms.

The results of this last exploration showed the probable existence of an immense submarine plateau along the whole coast line south of Cape Hatteras to the latitude of the Bahamas. Further examination by Commander Bartlett in 1881 developed an immense plateau, of a triangular shape, reaching from the Bahamas to a point immediately S. of Cape Hatteras; and Mr. Agassiz adds in a note that Lieut. Commander Brownson, U.S.N., has since established the fact that this plateau (here called the *Blake*) commences slightly to the westward of Great Abaco. Lieut. Commander Brownson proved also that to the S. the eastern edge of the Bahama Bank continued but a short distance seaward parallel to the general line of the outer row of islands of the group till it united with the plateau of Porto Rico and the Caribbean Islands, leaving probably one or two deep passages extending towards the old Bahama Channel north of St. Domingo and Cuba, leading to the Windward Passage.

The observations show that the bottom of the Gulf Stream along the Blake Plateau is swept clean of slime and ooze and is nearly barren of animal life.

The current observations indicate that the velocity of the Gulf Stream in its axis, where it is greater than along the edges, varies from two miles an hour, or less, to fully five miles. The velocity rapidly decreases to the N. In the latitude of New York it is two and a half miles an hour; off the Banks of Newfoundland it is reduced to one and a half or two miles; and three hundred miles to the eastward it is scarcely perceptible. The force of the stream is kept up, not merely by the differences in oceanic temperature, but by the actual pressure of the heaped-up waters driven by the tradewinds into the Gulf of Mexico. The officers of the U.S. Coast Survey have discovered by a most careful series of levels from Sandy Hook and the mouth of the Mississippi River to St. Louis, that the Atlantic Ocean at the first point is 40 inches lower than the Gulf of Mexico at the mouth of the Mississippi.

After an introductory sketch of Deep-Sea Work, Prof. Agassiz treats successively in the first volume the Florida Reefs, the topography of the Eastern Coast of the North American Continent, the Relations of the American and West Indian Fauna and Flora, the Permanence of Continents and of Oceanic Basins, the Deep-Sea Formations, and Fauna, the Pelagic Fauna and Flora, the Temperatures of the Seas Explored, the Gulf Stream, Submarine Deposits, and the Physiology of Deep-Sea Life. The second volume gives the classification and summarised description of the collections made. The reports on these collections have yet to be

completed by eminent specialists, who have undertaken the different subjects.

The richest harvests were gathered, Prof. Agassiz says, not from the deepest waters of the West Indian or Atlantic areas, but mainly on the continental slopes near the five-hundred-fathom line, where food is most abundant, or the slopes are washed by favorable currents. He adds: "Several places really phenomenal from their richness were met with by the 'Blake,'—off Havana, to the westward of St. Vincent, off Frederichstæd (Santa Cruz), off the Tortugas where the Gulf Stream strikes the southern extremity of the Florida Reef, and off Cape Hatteras. . . . We may safely say that the abundance of life in the many favored localities of the ocean far surpasses that of the richest terrestrial faunal districts. The most thickly populated tropical jungle does not compare, in wealth of animal or vegetable life, with a marine district such as a coral reef, or some of the assemblages mentioned."

The mechanical execution of the "Three Cruises" is admirable. The paper and typography, the maps and the many beautiful illustrations, give it a place among the finest books of the year.

Tropical Africa.—By Henry Drummond, LL.D., F.R.S.E., F.G.S. *Authorized Edition, with Six Maps, and Illustrations.*

New York, 1888.

Mr. Drummond's book is, according to his preface, a few lecture-notes thrown into popular form as a general sketch of East Central Africa.

He does not conceal the fact that a special reason

exists just now for writing about Africa, because recent events on Lake Nyassa have stirred a new desire in the hearts of those who care for native Africa that the "open sore of the world" should have a last and decisive treatment at the hands of England.

Thus far the preface. For the notes themselves, it must be said that they are bright and reasonable, if not always convincing. Every spirit, as yet undisturbed by the rumor of this world, will feel the beauty and the justice of the tribute paid to Mrs. Livingstone. Her grave . . . "is an utter wilderness, matted with jungle grass and trodden by the beasts of the forest; and as I looked at the forsaken mound and contrasted it with her husband's tomb in Westminster Abbey, I thought perhaps the woman's love which brought her to a spot like this might be not less worthy of immortality."

The geography of Africa is sketched in a few broad strokes. There is first a coast-line, low and deadly, and two or three hundred miles broad; then a plateau of from 2,000 to 3,000 feet in height and some hundreds of miles wide; and beyond this the Central African plateau, 4,000 to 5,000 feet high. Three great rivers descend from the Central Plateau, the Nile, flowing to the N., the Congo, to the W., and the Zambesi, to the S.E. The Niger, rising far in the west, flows to the N., the E. and the S., and finds an outlet in the Gulf of Guinea.

These four great rivers, though interrupted by falls and rapids, offer, with the great lakes, the means of penetrating to the interior. Explorers do not necessarily lose their way when they leave the rivers. Mr. Drummond says: "Probably no country in the world, civilized

or uncivilized, is better supplied with paths than this unmapped continent.

“Every village is connected with some other village, every tribe with the next tribe, every state with its neighbor, and therefore with all the rest. . . . These tracks . . . are foot-paths, never over a foot in breadth, beaten and hard as adamant, and, as a rule, marvellously direct.”

The African traveller must face the fever. No European ever escapes it, and the natives, particularly in changing from place to place, suffer equally with the Europeans. Quinine is almost the sole remedy.

Mr. Drummond believes that, with opportunity and inducement, the Africans will work. Forty-six miles of the Stevenson road between Lake Nyassa and Lake Tanganyika were built, he says, entirely by native labor, and could not have been better done by English navvies. Nevertheless, it is not to be expected that the natives will follow any regular occupation so long as the supply of ivory holds out; and the disappearance of the elephant will be, taking all things into consideration, a decided blessing to Africa.

The “Diary” is full of instructive observations, and the essays and short papers which Mr. Drummond has included in his volume are delightful reading.

It is when he takes up the subject of the slave-trade and what he calls a “Political Warning,” that he and his reader must part company. Every one knows that all the other obstacles in the way of African progress are as nothing in comparison with the traffic in slaves, but dispassionate minds fail to see why this traffic must necessarily continue to flourish, unless the control of the

most desirable positions in Central Africa is handed over to England. It is not to be doubted that the English rule would be a great improvement on any native African government, but there is nothing on record to show that England is in any way better fitted for the work of civilization in Africa than France, or Italy, or Germany, or Portugal. Each one of these four nations openly seeks in its colonies and protectorates, first of all, its own interest : but no one of them loses sight of its obligations to humanity. England also, it must be acknowledged, is mindful of her responsibilities, but those who undertake to speak for her protest too much, in season and out of season. Their pretensions to philanthropy and their fondness for preaching are scoffed at by an unbelieving world, and tend to weaken the influence of the nation. It is abundantly proved that Africa must be redeemed by help from abroad. If the field were open to her, China would probably handle the Africans in the most satisfactory manner : but the Europeans are on the ground with their work before them, and they ought to act in concert. To do this, they must respect each other, a thing hardly possible if England is to monopolize the virtues.

China : Its Social, Political and Religious Life.
—From the French of G. Eug. Simon.

London, :887.

This book should have appeared in the happy days of the eighteenth century, when every one with a tincture of philosophy regarded the Chinese Empire as the ideally perfect State, partly because it was a long way off, but much more because it was Pagan. M. Simon

appears to have lived a long time in China, and to be well acquainted with many parts of it. He philosophizes continually, but he gives, also, much statistical information about the revenue and resources of the country, the cost of living, and the income of a working family, and other dull matters that pertain to earth ; but he is giddy with enthusiasm, and all his pages are suffused with a celestial rosy red light.

People, government, religion, laws, morals, manners, all are sweetness and righteousness and peace. The Chinese peasant is a wonderful combination of Confucius and St. Francis of Assisi and Chesterfield.

There are no bad boys in China ; only little angels with pig-tails for wings.

What the Central Flowery Land is any other country may become, by getting rid of supernatural religion, and accepting the civilization which has taught the Chinese "how to spiritualize the earth and the worship of Heaven."

M. Simon has done what he could to darken counsel by words, not, indeed, without knowledge, but wholly without wisdom.

Through the Yang-Tse Gorges, or Trade and Travel in Western China.—By Archibald John Little, F.R.G.S.
London, 1888.

Mr. Little's book is the transcript of a journal kept by him during a two months' journey from Shanghai to Chung-King, in Western China.

The Yang-tse is, he says, the sole means of communication between the east and the west of the Empire, for roads, properly so-called, have no existence. The

Yang-tse divides China into nearly equal parts, eight provinces lying to the N., and eight to the S. of the river, and two, Ngan-hui and Kiang-su, lying across it. For about 2,000 miles the Yang-tse flows through mountain land, from which it issues at the I-chang Gorge, 1,000 nautical miles from the sea. Chung-King, Mr. Little's farthest western point, is 400 miles above I-chang, and between these two places there is an almost uninterrupted series of rapids, though the total fall for the distance is only 467 feet. For the lower and more tranquil 1,800 miles of its course, the great river runs with a speed twice that of the Nile or the Amazon, and three times that of the Ganges.

The voyage from Shanghai to Hankow was made in one of the large river steamers, with stoppages for landing passengers and freight.

At Hankow boats were engaged for the four months' voyage into the interior, and Mr. Little's experiences during this time did not leave a very favorable impression on his mind. He found everywhere signs of misery and poverty and dirt and neglect. The villages were wretched and he was hunted, whenever he landed, by crowds of beggars. At the same time, he makes the ingenuous confession that the misery was, perhaps, more apparent than real, for the ground was well cultivated, and the wheat fields stretched, in places, as far as the eye could reach. The climate everywhere was mild, though it was early in March.

That the rapids are not formidable obstacles to navigation is sufficiently shown by the fact that boats are towed against the stream by human muscle, and Mr. Little is probably in the right in his conclusion that

steamers would find no difficulty in making regular trips. The tow-lines now used are made of bamboo, plaited into a cable as thick as a man's arm, but a single voyage wears out the line with the friction against the granite rocks, which are deeply scored.

Here, as elsewhere in China, if the works of man are vile, those of nature are grand. The Wu-Shan Gorge, on the border of Sze-Chuen, is twenty miles long, and from 350 to 600 yards in width. The river, which the Chinese believe to be unfathomable, "winds round the base of precipitous cliffs, rising in places to 1,000 feet, with loftier mountains behind, throughout the whole length of this gorge. The entrance, as the river seems to disappear behind' the mountains—range upon range of which rise above us, the highest summits just projecting above the fleecy clouds—presents a sublime and solemn aspect. The silence is complete: the rare junks are lost in the immensity of the surrounding nature." . . .

In Sze-Chuen Mr. Little found fewer indications of ruin and poverty, but dirt was everywhere. He commiserates the mandarins, whose task is a hard one, and he doubts whether the missionaries can do anything for a country which already possesses, "in the teachings of Confucius, a doctrine in no way inferior to Christianity;" but his general view of the Chinese civilization is almost the opposite of that taken by M. Simon.

It is plain that both cannot be right, and the subject is, perhaps, too vast to be disposed of in a single volume, or by one man.

TITLES OF PAPERS IN GEOGRAPHICAL JOURNALS.

BERLIN.—*Gesellschaft für Erdkunde, Verhandlungen.*

On the Economical Aspects of the Trans-Caspian Railway—The Physical and Zoological Relations of the Baltic—The Severe Winter of 1887–88 in Upper Italy—The Eighth German Geographical Congress in Berlin—Toll's Journey to the New Siberian Islands—The Transvaal and Its Gold-Fields—Geography and Ethnography of Southern Mesopotamia—The Isthmus of Corinth.

Zeitschrift.

Sir John Mandeville and the Sources of his *Travels*
—The Rains of the Iberian Peninsula.

Deutsche Kolonialzeitung.

Letters of an African Prince—Voyages of German War Ships in 1887—The Congo State, Stanley and England—The Mining Law for Southwest Africa—Madagascar and its Commerce with Germany—The Change of Ruler in Zanzibar—Australia and the South Sea—Germany, England, and South Africa—The Question of a Government Bounty for the East African Steamers—The Mahometan Opposition to Christian Influence in Central Africa—Portuguese Colonial Management—On German Emigration—German Mail Communication with East Africa—English Newspaper Sentiment.

BREMEN.—*Deutsche Geographische Blätter.*

Report of a Voyage to the North Polar Sea and to Spitzbergen in 1886—The Commercial Rela-

tions of Persia—J. G. Kohl's American Studies (by Hermann A. Schumacher).

BRUSSELS.—*Société Royale Belge de Géographie, Bulletin.*

A Journey to the Interior of Greenland (Peary and Maigaard)—Exploration of the Kassai and Sankuru—Seneffe.

BUENOS AYRES.—*Instituto Geográfico Argentino, Boletín.*

Statistics of Population of Buenos Aires.

EDINBURGH.—*Scottish Geographical Magazine.*

Exploration of Gulf of Guinea—Recent Botanical Exploration of Arabia—Bathymetrical Survey of the Chief Perthshire Lochs and their Relation to the Glaciation of that District—A Short Geographical and Historical Sketch of Bosnia and Herzegovina—Caucasian Idioms—The East Central African Question—The Extension of Arab Influence in Africa—Recent Explorations in Tierra del Fuego.

FLORENCE.—*Sezione Fiorentina della Società Africana d'Italia, Bullettino.*

Our African Possessions and their Future—The Language of the Gallas—The Duty of Italy to Succor the Italian Missionaries—Massowah : Facts and Ideals, Near and Remote—Assab in 1886.

GOTHA.—*Petermanns Mittheilungen.*

The New Edition of Stieler's Atlas—Cartographic Results of a Journey in the Colombian Andes—Continental Centres—The North Cape of Iceland—Development of Population and Settlement in the United States—The Nanusa Islands (Lat. 4° 35' N., Lon. 127° 5' E.)—Em-

ployment of Elephants for the Exploration of Unknown Regions—The Position of the Magnetic Pole in Relation to the Distribution of Land and Water on the Earth—The Voyage of the *En Avant* on the Ubangi—The Glaciers of the Thian-Shan.

LONDON.—*Royal Geographical Society, Proceedings.*

Journey in the Interior of Labrador, July to October, 1887—Lectures on Geography, by Gen. Strachey—On the Ruby Mines, near Mogok, Burma—Mr. F. C. Selous's Further Explorations in Matabele-Land.

MADRID.—*Sociedad Geográfica, Boletín.*

An Ascent of Pichincha in 1582—Brief Considerations on the State of the Spanish Possessions in the Gulf of Guinea.

MANCHESTER.—*Geographical Society, Journal.*

Railway Connection of Burma and China—Social System of the Lower Congo—Manchuria—Ruby Mines of Burma—The Dyaks of Saráwak, Borneo—Physical Geography and Trade of Formosa—The Bangala—Matabeleland and the Country between the Zambesi and the Limpopo Rivers.

NAPLES.—*Società Africana d'Italia, Bollettino.*

The Future—Keren—Africa at War—The English and Germans in Africa—The Country of the Garanganze—Italy and Abyssinia—From the Camp at Tamarisco—The Mission of Italy in Africa.

NEW YORK.—*Science.*

Address of the President of the National Geo-

graphic Society—The Yukon Expedition, 1887—Exploration of the Obangi-Welle—Explorations in Greenland.

PARIS.—*Société de Géographie, Compte Rendu.*

Nansen's Expedition to Greenland—The Frontiers of Tonkin and China on the Gulf of Tonkin—Origin of the Names Senegal, Galam, and Casamanca—The First French Explorers of the Sudan—Great Fall of Snow at Copenhagen (March 10-13, 1888)—Explorations in Indo-China—Discovery of an Island in the Arctic Ocean—Mt. Woso, in Ethiopia—The Island of Réunion—Changes in the Bed of the Hoang-Ho—General Adoption of the Gregorian Calendar—Reception of Lieut. Caron.

Société de Géographie Commerciale, Bulletin.

The Caucasus and the Trans-Caspian Country—The Canary Islands—Journey Across the Pamir—Mesopotamia and Persia—French Commerce and the Cultivation of Oil-Plants in Algeria—The Morocco Frontier.

ROME.—*Società Geografica Italiana, Bollettino.*

Italian Missions and Schools in the Orient—Italian Interests in the East—The Corinth Canal—The Sund (the Sound between Denmark and Sweden) or the Öresund—On the Name of "America" (by Luigi Hugues)—On Some Geographical and Chronological Problems Connected with the Movements of the Earth (by S. Millosevich)—The Map of Massowah and Saati.

TURIN.—*Cosmos.*

The Italian Possessions in the Red Sea and the Second Armed Expedition to Massowah—From the Bay of Assab to Shoa—Relative Position of the Monte Mario (Rome) Meridian to that of Greenwich—Recent Danish Explorations in Greenland—Auser, Arno and Serchio in Pisa—The Mayas—Latitudes Determined in Central Asia by Dalglish, of the A. D. Carey Expedition.

VIENNA.—*Mittheilungen der K-K. Geographischen Gesellschaft.*

The Province of Assam, British-India—Hann's Meteorological Atlas—An Attempt at a Determination of Mean Heights and Depths of the Earth—Changes in the Course of the Reno (affluent of the Po)—Changes of Level in the Lakes of Upper Armenia (Dr. Robert Sieger)—The Mountain System of Borneo—Contributions to the Expedition to Persia in 1882 (Dr. J. E. Polak).

WASHINGTON LETTER.

WASHINGTON, June 15, 1888.

A Conference of representatives of the Maritime nations is to be held at Washington, to revise the rules of the road at sea and the code of flag and night signals; to adopt a uniform system of signals indicating the direction in which vessels are moving in fog, mist, falling snow and thick weather, and at night; to discuss methods of saving life and property in shipwreck, etc. Five delegates, to represent the United States, will be appointed by the President.

Commander John Russell Bartlett, Chief of the U. S. Hydrographic Office, has been relieved from duty at his own request, and granted leave of absence for one year. It is understood that at the end of this period he will offer his resignation, in order to take charge of business interests at Providence, R. I. His retirement from what should have been a life-work is a public loss, greatly to be deplored.

Mr. B. A. Calonna, Assistant in charge of the Office and Topography of the U. S. Coast and Geodetic Survey, has added a new feature to the Catalogue of Charts and Other Publications, recently issued. This consists of diagrams, or index maps, so printed as to form part of the text of the Catalogue, and arranged to show the location of the charts referred to on the opposite page.

This will add to the usefulness of the Catalogue, which now extends to 138 pages 4°.

The Samoan question is, possibly, not quite settled. The President transmitted to Congress, under date of April 2, a document of 311 pages, covering: the Report of Mr. Geo. H. Bates, Special Agent of the Department of State, on the history of the Islands since the overthrow of the Steinberger government in 1876; the Report of the German Special Commissioner; and the Report of the British Commissioner. The last reviews the geography and history of the group. Among other papers are the Steinberger Constitution of 1875 (reprinted from a local journal), the municipal regulations of Apia, Maps of German and English land claims, etc. There is pending in the House of Representatives a Joint Resolution requesting the President to interpose the good offices of this Government to aid the Samoans in securing their independence.

By an Act approved March 20, 1888, the Director of the U. S. Geological Survey is required to study the practicability of constructing storage reservoirs for water in the arid portion of the country. The region in which agriculture must depend wholly upon irrigation is broadly defined by the Director as that lying W. of the 100th meridian, and embracing about 1,300,000 square miles. Deducting about 300,000 square miles for lands irreclaimable under present systems, there are left 1,000,000, which need only water to be made productive. These lands represent, at \$1.25 per acre (the minimum price of public land), a valuation of \$800,000,000; at \$30 per acre, a moderate estimate for irrigated land, they would be worth \$19,200,000,000. There can be no doubt as

to the practicability of the scheme, though it may be some time before even the smaller sum is paid into the U. S. Treasury. The Director of the Survey thinks that, after locating and investigating a number of drainage districts, the first and most important part of the work will be the construction of topographical maps, with the necessary detail.

If the requisite appropriation is made by Congress, the work will be begun without delay.

Special Issue, No. 9 (May 3, 1888) of the U. S. Consular Reports, notices the arrival in Moscow, in February last, of Capt. Jos. Wiggins, an Arctic explorer well known in England. In August, 1887, Capt. Wiggins left Newcastle-upon-Tyne in the steamer *Phoenix*, passed around the North Cape and through the Kara Strait to the Yenisei River, which he ascended for 1,000 miles, and there left his vessel for the winter. This is his third voyage made in the same way to the Siberian Coast.

H.

THEODORUS BAILEY MYERS.

BORN DECEMBER 13, 1821.

DIED JUNE 16, 1888.

Col. T. Bailey Myers became a Fellow of the American Geographical Society in 1852, when it was founded, and held a seat in the Council from the year 1870 until his death. In 1873 he was elected, and served one term, as Vice-President.

This is the bare record of dates ; but to those who survive his memory is associated with the history of the Society, with its early struggles and with its present condition of prosperity.

Col. Myers had a fondness for liberal studies, and especially devoted himself to the collection of original documents relating to American history. His zeal in the cause of geography was hardly less marked, and every measure proposed for increasing the Society's means of usefulness was assured beforehand of his energetic co-operation ; but for the past three years failing health had forced him to withdraw from active participation in the work, which never ceased to interest him.



ST. BASIL.

MININ - POJARSKI MONUMENT.

RESURRECTION GATE.

RED SQUARE, MOSCOW.

BULLETIN
OF THE
AMERICAN GEOGRAPHICAL SOCIETY

Vol. XX

1888

No. 3

MOSCOW, THE MAGNIFICENT.

BY
WILLIAM LIBBEY, JR.

EVERY one who has crossed the beautiful Italian plains on his way to the "Eternal City" remembers the fascination of the great dome of St Peter's as it gradually rose above the horizon and seemed to choose as its only proper contrasting background the faultless blue of the sky. A similar feeling must enter the mind of the traveller as he approaches the gilded domes of Moscow, the Holy city of the Russians—the Rome of the Greek church.

Situated as it is on the boundary line of civilization, a busy commercial and manufacturing city, it has much to interest and instruct. With a history peculiar in its originality, and with problems which puzzle the political economist of to-day, it might well serve as a text for the discussion of many delightful topics. To the average traveller, however, such information must be taken for

the most part at second hand, and on faith, but what he can see is far differently treated, for he has some tangible evidence of its reality; and if he cannot believe all the wonderful tales of his encyclopædic courier—and much of the pleasure of sight-seeing is in believing—he can at least fall back on written history and find enough to charm him.

The city is unique in its way, and is one of the world's great centres in more senses than one, though it has few of the characteristics of other European cities. It seems like a gigantic village when viewed from some lofty tower, for, with the exception of the more densely populated portions, the houses are scarcely ever more than two stories high, generally situated in a garden or court, and surrounded by a wall. One of the striking peculiarities of the city, however, is its lack of unity in the various parts. It is a most curious mixture of the grand and the miserable.

As we pass along some magnificent street nothing would seem to be wanting to make the surroundings perfect, but a few steps to one side bring us into rough, irregular passage-ways whose pavement is hard to describe and which can only be spoken of as orientally unclean.

The city was founded in 1147 by the Grand Duke of Kief, Jury Wladimirowitch Dolgoruky, but was of no importance until the Grand Duke Ivan transferred his residence thither in 1328, from which time it became the centre of the Russias; and his example was soon followed by the Metropolitan, Theognost, the ecclesiastical head of the Greek church.

In 1339 Ivan surrounded the city with a wooden

wall, and gave it the Tartar name of Kreml, which signifies a fortress. This portion is now the heart of the city, and, in a most perfect sense, its Acropolis. The city grew, and soon a new wall was built around what is now called the Chinese city, which is very closely built up, and contains the bank and the great market place. This wall still exists in part, and the gaudily painted towers over the different gates present a very striking appearance. These old divisions as well as the more recent ones are now neglected, and the rust on the hinges of the gates and the portcullis points indicates long disuse.

Of course, in those early days it had to pass through many trials, being almost destroyed by the Mongol hordes, and it only reached its first period of growth under Ivan III., called "the Great" because he freed Russia from the Tartar yoke and formed an independent state, with Moscow as its capital.

The prosperity of the city since that time has only been interrupted by fire in 1547 and by its surrender to the Khan of the Crimean Tartars in 1571.

It almost seemed as though its glory was departing when the imperial residence was changed to St Petersburg in 1711, but Peter the Great's successor preferred Moscow, and since his day, although the former city has been the capital, Moscow has lost none of its charm even for the ruler.

The history of the city in 1812 is world renowned. After that terrible series of bloody battles with Napoleon, the Russian generals decided to surrender Moscow to the French, and on Sept. 14th the Governor of the city left it, accompanied by most of the inhabitants, after removing everything which would be helpful to their

enemies, and then setting fire to their homes. On Sept. 15th the French made anything but a triumphal entry into the city, now about two-thirds burned, and two days later they retired, leaving behind them 40,000 of that proud army of 150,000 men (which had been so successful up to this point) to die of hunger. This was the turning-point in the career of the "man of fate," and ever after, in spite of his desperate efforts, nothing seemed able to stay his downward course. Perhaps if the 400,000 men left on the weary Russian wastes, the best blood of France and the finest soldiers the world had ever seen, had not been sacrificed to ambition, the fate of the great Emperor would have been different.

The spot towards which the traveller first makes his way will probably be the famous public square of the city, the Krasnaja or Red Place. It is usually approached through the Iberian gate, an archway under a building which also contains the chapel of the Iberian Madonna. This chapel contains a copy of the Mt. Athos picture made in 1648, and is held in great repute among the Russians, nearly every one of whom enters the chapel, for a few moments at least, as he passes under the arch. The picture is believed to possess great power and is often removed from its place to be taken to the bedside of the sick, or to lend the benign influence exerted by its presence to increase the joy of family festivals. When it is thus taken away its place is occupied by a copy, while the original is placed in a carriage drawn by six horses, accompanied by liveried men, and is thus borne to its destination. These visits are well paid for, the chapel receiving the equivalent of fifty dollars for each one. Passing under the archway we come out

upon the square itself, on which so much that is terrible, awe-inspiring, and magnificent has taken place, and which has done so much in the formation of Russian history. On our right is the great mass of the Kremlin, with two of its gates opening upon the square; in the centre is the monument to Minin and Posharsky; at the further end is the odd church of St. Basil and the tribune, while on the left is a curious set of low buildings, the Gostinny Dwor, or market place. These arcades, with their 6000 shops, are always interesting. Here you will find a jumble of everything from a needle to a ship's anchor, or, as our German friend neatly expressed it, "everything possible and some one or two things besides." One is tempted to believe that a Russian would be deprived of half of the joys of life if he could be robbed of the privilege of haggling. Our sidewalk financiers seem to be modesty itself when compared with these vendors of clothes of all degrees of antiquity.

Near the corner of this building, on the square, is a circular platform with a wall around it, which is built like a tribune. Here the Czars were proclaimed, and solemnly published their ukases, and the great religious processions start from this spot. It was formerly the place of execution, and the heads of the victims, lifted upon spear points or poles, formed the dismal and horrible decorations of the tribune. Here Ivan the Terrible in 1570 announced in person the executions as they took place. It was here that the false Dmitry in great state received the homage of his people in 1605, and but a year later the infuriated mob dragged his lifeless body to the same spot.

The monument which stands in the centre of the

square bears the inscription, "A thankful Russia to the peasant Minin and the prince Shchekinsky," and recalls the troublesome times of the interregnum of 1606-13. It was erected by Alexander I. in 1818, and is a handsome bronze group upon a granite base, with reliefs on the sides representing the liberality of the people. The loyal patriot Shchekinsky was born in 1578. He killed Dmitry at Colomna in 1608, dispersed the robber hordes in 1609, but in an uprising against Wasili was wounded near Moscow in 1611. He was taken from the battlefield to the Troizki cloisters, and then fled to his estates. At this juncture Minin, a butcher from Nizni Novgorod, came to his aid with money, men and arms, and he is represented on the monument as in the act of placing a sword in the hands of the Prince and inciting him to action. The result of this co-operation was a three days' battle in 1612, which ended in their enemies being driven away, and Russia was once more free.

We shall now turn to the consideration of St Basil, probably the most fantastic building in Moscow. It was built by Ivan the Terrible in 1554, and commemorates the taking of Kazan. The two stories contain eleven chapels, which are connected by labyrinthine paths, and are crowned by a dozen curiously carved domes, all of different shapes, and decorated with the most striking contrasts in color. The apostles of polychromatic architecture will find all their longings satisfied here. The old story of the relations between the Czar and the architect is interesting in spite of the number of grains of salt which must necessarily be taken with it. Upon the completion of the structure, the autocrat is said to have asked whether its author could construct another such

masterpiece, and upon being told that he could, ordered the poor fellow's eyes put out ; and then, as if that were not enough, commanded him to be killed when he said that he could still build a more beautiful temple. The story may be in keeping with what we know of the character of Ivan the Terrible, but, whatever the fate of the architect, his work will always have a charm from its unique appearance, and will probably be more vividly retained in the mind than many of the other wonderful sights of this strange city.

Before passing from this square to the review of some of the more important buildings of the city, let us pause for a moment to look at the gay street life, which is so characteristically Russian.

Moscow is believed to be the only place in the world where the representatives of so many nations can be found. On its broad streets and squares the great markets and fairs are held, and during these seasons Bedlam itself could not present stranger contrasts or more interesting scenes. It is true that the so-called French clothing is much worn, but side by side with it we find the bearded mujik with his peculiar coat and high boots, the dreary priest with his long garments, the merchant in his old skin cap, and among the crowd of curious costumes one can pick out here and there a Tartar or Kalmuck, and occasionally a Turk, Greek or Persian.

Passing along these busy streets we come to the square, where all the reviews take place, and find ourselves before the great theatre. It was built in 1853, and is one of the largest and most tastefully constructed in Europe ; the interior is white, richly gilded, contains six galleries and has a seating capacity of four thousand.

The façade has eight well-proportioned Corinthian columns at the front of the portico, and a quadriga, or four-horse chariot, a magnificent piece of bronze, representing Phœbus in the chariot of the sun, crowns the richly adorned portal.

Moscow may be well said to be a city of contrasts, not only between the extremes of the palace and the cabin, but also between the palaces themselves. In many of these the former splendor is gone, but they have been made the repositories of countless treasures, and transformed into museums. Many have been used for other purposes, and altogether they form one of the peculiarities of the city, but a passing mention of a few is all that our space will allow.

The Paschkoff House, built in the Renaissance style, is now known as the Rumjanzoff Museum, as it contains the collections made by Count Rumjanzoff for the Government in 1828. They were placed here in 1861. The lower floor contains a fine library of 200,000 volumes, which is rich in historic works, particularly those relating to Slavic and Old Russian history. In the exhibition rooms above we find, among many other collections, that of Kotzebue, the celebrated navigator, comprising the ethnological objects brought together in his trip around the world. There is also a very instructive group of figures to be seen here, giving by means of original costumes from all parts of Russia a very good idea of the differences to be found among the various races under the sway of the Czar.

Another interesting as well as remarkable building is the Ssucharew tower, built by Peter the Great in 1695 in honor of the Ssucharew regiment, which protected the

young Czar and his mother in the insurrection of 1682, and enabled them to fly to the Troizki cloisters. It has served various purposes; at first it was used as the assembly rooms for the State Council; then as the Neptune Society Lodge, instituted and presided over by the Czar; then it became the Navigation School, and still later the Admiralty building. In 1829 it was transformed into a water tower, the upper part containing two immense reservoirs, with a daily capacity of 2,000,000 gallons. The water is brought from a distance of seventeen miles.

Situated in a delightful park, which is the principal resort of the fashionable life of Moscow, we find the Petrowski Palace built by Catherine II. in 1776. It seems like a perfect waste of good material, as it is only used on grand occasions as a temporary residence. Here the general nobility await the coronation festivities. The great park was laid out by the Czar Nicholas in 1834, and its beautiful driveways and footpaths display much taste. The gardens contain a summer theatre, a *café chantant* and several restaurants.

The city abounds in convents and monasteries, which possess many wonderful shrines and treasures, but one only can be taken as an example.

The most attractive convent is that known as the Passion Convent. It is situated at one end of an open space called the Virgin Field, the spot being memorable because there the messengers of the Khan of Mongolia picked out the maidens who had to be sent to him each year with the tribute money. The convent is a conglomerate of churches and buildings surrounded by a wall, and was built in 1524 to commemorate the union of Smolensk and Moscow. Many of royal blood have

taken the veil in this convent, among the most noted being the Czarina Irene after the death of Feodor I. Here Peter the Great placed his sister for her intrigues. It will be remembered that the Strelitzians rose and offered her the throne. After this rebellion was put down, Peter considerably had some three hundred of the rebels hung before the window of his sister's cell, which is still pointed out; and as though this were not enough, he had the hand of Prince Chowanski, one of the conspirators, nailed in the window itself. Just as the French were leaving Moscow they tried to blow up this convent, but the catastrophe was prevented by the bravery of the nuns.

Probably the finest monastery in this whole region is the Troizki Monastery, situated not far from Moscow. Next to the famous monastery of Kiev, it is without doubt the finest and richest in the nation. Its wall with eight towers surrounds a royal palace, a theological seminary with a very valuable library, the residence of the Archimandrite, and twelve churches and chapels, with countless towers and domes, all of which are gilded or most elaborately painted. The history of this place is long and interesting, though bound up with much that is superstitious. Its humble beginning was made in the small wooden chapel built on the site of the present Trinity church by the Abbot Sergius. His piety soon drew the monks from all quarters towards the spot, and such was his reputation that on the death of Alexius he was chosen Metropolitan, the highest ecclesiastical honor of the Greek church. During one of the Tartar invasions the establishment, which was then very renowned, was destroyed. A few years later, the unde-

cayed body of Sergius was found among the ruins. People crowded to pray near his body, and from their offerings the monastery was once more built and soon became very rich. It has resisted many sieges, at one time owning 120,000 serfs and being able to call together 20,000 men-at-arms of its own. That it was not attacked by the French is said to be due to the picture of the revered Sergius, but the fact that it was rather out of their track is probably a better explanation. This picture of Sergius was taken to Sebastopol, but did not prevent the downfall of that stronghold, as it was thought it would. Among the many other wonders shown is a napkin with the features of Christ upon it, which is peculiarly sacred.

Probably the finest building in the city, taking it all in all, is the church of the Redeemer. It was begun in 1839 by the Czar Nicholas in remembrance of the deliverance from the French. The main structure is composed of iron and stone and cost \$10,000,000. It is built in the form of a Greek cross and has five gilded domes, the central dome being one hundred feet in diameter and three hundred and twenty-five feet high. Thirty-six gigantic columns support the portico, beneath which the majestic bronze doors, handsomely sculptured, open into the temple. The interior is richly decorated with gold, marble, and costly mosaics. On the walls of the corridor of the main dome are the names of those who fell in the battles for freedom. Each portion of the building has the masterpiece of some Russian artist, and represents a scene from Biblical or Russian history. All are noteworthy, but two are especially worthy of attention. The great painting back of the high altar in the Holy of Holies, representing the Last Supper, was

painted by Ssemeradski and will repay close investigation, for it is a wonderful character study and is peculiarly impressive, being clearly conceived and strikingly executed. There are four other great paintings, which occupy the niches in the intersecting points of the arms of the Greek cross, and face the central part of the church under the main dome ; that directly behind the spot where the Czar stands during service, when here, represents the anointing of David, and is probably the best of the four. The impression produced by this enormous mass, with its treasures of art, its wealth in gold and precious stones, and its graceful and highly ornate altar, is hard to describe. We often speak of barbaric splendor, but this is no place for such statements ; here all the requirements of art and taste are fully met, and nothing disturbs the thrill of satisfaction and awe with which every one passes among the countless brilliant objects.

Nothing seems wanting to complete the charm until the grand burst of harmony with which the service begins, and then this is recognized to be indeed a temple perfect in every respect.

We shall now turn our steps to the Kremlin, in which all the memories of the past centre.

It is a great collection of cathedrals, palaces and state buildings, surrounded by a massive wall sixty feet high and a mile and a half long, with many towers and five gates, one upon each of its five sides, and all interesting from their architecture or history.

We pass in by the Holy Gate, the most remarkable of all the gates of Moscow. The older portion of the tower was built in 1491 and the clock tower was added in 1626. There is a chapel on each side of the door-

way, but all interest centres on the picture of the Redeemer over the gate, before which a lamp constantly burns. This is the palladium of the Kremlin. It was brought from Smolensk in 1647 and an edict of the Czar Alexis required every one to uncover his head on passing through the archway, and the edict is still obeyed. The unfortunate stranger who fails to conform to the usage is very suddenly brought to his senses by savage remonstrances from the police and every Russian that happens to be about. The sanctity and power of this picture are believed to be very great. The French soldiers as they passed into the Kremlin under the archway are said to have fired at it without harming it in any way, a tradition which seems to make it all the more sacred to the Russians. Once inside we begin to appreciate the attraction which the Kremlin possesses for all visitors. Volumes have been written and will still be written upon the glories of this city within a city, with its magnificent palaces and churches.

The first object which strikes the eye is the cathedral and tower of Ivan Weliki, the chapel of the patron saint of all ladies about to be married. The most remarkable thing about the building is its bells, of which there are thirty-four. The tower is crowned by a large golden cross which has an interesting history. Napoleon had heard the legend which connected the fall of the Russian Empire with the fall of this cross, and accordingly was resolved to have it down. He offered large rewards for the accomplishment of the difficult feat, but none of the French dared attempt it. At last a peasant, allured by the tempting sum offered, accepted the terms and succeeded in his efforts, but his

ill-gotten gain served him for only a short time. Napoleon ordered him to be put to death, using those words, so characteristic of him, "J'aime la trahison et je déteste le traître."

At the base of the tower lies the great bell of Moscow, and it is the historic bell of the place. When first cast in 1553 it weighed 36,000 lbs; it was re-cast in 1654 and then weighed 288,000 lbs, and was hung at that time on a frame at the foot of the tower. It fell in 1706, and in 1733 was cast once more, 444,000 lbs. of metal being used in its construction; it was hung again on a frame, but four years later the enormous weight proved too much for its supports and it fell, a large piece breaking from one side. Some years later it was placed upon the stone terrace where it now stands, the wonder of every one. It required twenty-four men to move the clapper in the days when it was used, and twenty persons can pass in an upright position through the hole in its side as it now stands, and find space to accommodate them inside. In the larger parts the metal has a thickness of two feet.

Every stranger is surprised at the number of the bells, but must admit that their sound at evening is one of the peculiar charms of the city. Their sweet tones are said to be due to the method of their construction and to the amount of silver and gold used in the compound. The peasants have the greatest reverence for these bells, and the weary and footsore pilgrim, as he trudges on towards this Russian Mecca, is said to forget all his trials when at last he hears their music far off, it may be on the distant hillsides. At any rate their bells are very different from ours, and it is quite true, as

Dr. Prime says, that "while our bells call us to worship, theirs praise God."

While upon the subject of such gigantic pieces of human workmanship, a passing reference should be made to the "Emperor Cannon," cast under the Czar Feodor I. in Moscow. It is mounted on a carriage cast in St. Petersburg. The gun is $17\frac{1}{2}$ feet long and weighs ten tons; its muzzle is three feet across, and the shot, four of which lie directly in front of it, weigh 1000 lbs. The only service it has ever seen was when it was pointed, while empty, at a mob, and the desired effect was produced; the logic of cause (or size) and effect was beautifully exemplified, for the mob instantly disappeared. It now stands a mounted guard over two long lines of French and Swedish cannon which decorate the sides of the arsenal.

Near Ivan Weliki stands the church of the Assumption—the crowning-place of the Czars and the burial-place of the Patriarchs. As we enter it we notice that its walls and columns are covered with paintings giving it an overcrowded appearance, which does not produce a fine impression. The Ikonostasis before the altar is very rich, and consists of five rows of holy pictures one above the other, mostly set in gold. The altar pieces are said to weigh 2700 lbs. and are all of precious metal. A picture of the Madonna, said to be by St. Luke, has a frame of gold valued at \$200,000, and a single emerald in the crown above her head is worth \$15,000. This treasure was carried away by the French, but was recaptured by the Cossacks, who presented the magnificent silver candelabrum with forty-six branches hanging before the altar, in commemoration of the event; two hundred pounds of silver were used in its construction.

In many respects this is the most interesting spot in Moscow. Between the four great central columns the coronation platform is erected. The Czar having separated himself from the people and fasted several days, enters the thronged cathedral attended by the most gorgeous pageant that the world probably ever sees; he ascends the platform, speaks, confessing his faith in the doctrines of the church, prays for his empire, and then, taking the crown, crowns himself, for no one is high or holy enough to crown him. He then goes into the Holy of Holies and takes the sacrament of the Communion, and thus alone consecrates himself to the throne of Russia. From Ivan the Terrible down to the present time all the Czars have been self-crowned on this spot. Here lie the great ecclesiastical heads of the Russian church—the Metropolitans. Among the treasures of this church are a nail of the cross and a piece of the seamless robe.

Near by is the church of the Archangel Michael, which contains the sarcophagi and relics of the Rurik and Romanof dynasties. One of the most curious of these is the coffin of Demetrius, the son of Ivan. He disappeared very mysteriously, and his remains are said to have been found by a miracle. They are greatly revered by the peasants, who kiss a portion of the Prince's forehead, which is exposed through a hole in the lid of the coffin. The church treasury is very rich, one source of its income being the holy oil which is prepared here. This oil is used in all ceremonies, such as baptism and the like, and is composed of gums, balsam and costly spices. Its holiness consists in the fact that it is supposed to be the same oil as that with which Mary anoint-

ed the feet of the Saviour. The true succession is kept up in an original and interesting manner. The oil was brought from Constantinople in the first instance, long ago, and is now kept in a copper vessel lined with mother of pearl. Each year when the oil is prepared, which is to be distributed afterwards throughout all Russia, a few drops are taken from this vessel and thoroughly mixed in the larger quantity, and the same number of drops is then replaced, the supply being kept good in this way. The silver vessels in which the oil is made weigh 1300 lbs.

At a short distance from this church of St. Michael is the church of the Annunciation. It was first built by Andrew III. in 1291, but the original structure and several others since erected upon the same site were destroyed by fire. It was finally rebuilt in 1554 by Ivan the Terrible, and was restored in 1863. It is the baptismal and marriage church of the Czars. Its nine gilded domes and the handsome gold cross over the central dome present an original and striking appearance. The floor of the chapel is of jasper, and the columns are decorated with the golden chains and crosses worn by the Czars, and fairly glitter with precious stones. The doors to the sanctuary are of solid silver. One of the peculiar ornaments of the interior, an ornament common to many Russian churches, is the historic battle-flags of the Czars. Famous among them is the black flag of Dmitry, which was also carried by Boris Godunow in his battles with the Tartars under the walls of Moscow.

We now come to the Kremlin, or main palace. The older palaces were built of wood and were burned by the Tartars. The Empress Anne built the first palace of

stone in 1484, and this has been added to or modified by each succeeding sovereign in some way or other, the greatest improvement being the addition made by the Czar Nicholas I., which contains the grand state apartments and in all some seven hundred rooms. The house-warming occurred on April 3rd, 1849, when the Emperor received bread and salt from the chief cities and provinces of the Empire as an expression of their congratulations. The rich gold salvers and salt cellars which contained these gifts now adorn the walls of the main state halls of the Palace. The Empress Catharine planned a palace for the same site which would have been the wonder of the world if it had been completed. The model alone, now on exhibition in the treasury, cost the sum of \$15,000.

The Granowitaja and the Terem are the only remains of the older palaces—and we shall look at these first.

The Terem consists of two portions. The two stories composing the upper portion or "Belvidere Palace" are smaller than the two lower, and the space on the roof thus left open is called the Holy Floor. The two lower stories were built by Ivan III. in the fifteenth century, and the upper portion was added by the Czar Michael for his sons in 1636. It was somewhat modified by Feodor in 1682, but, with the exception of some restorations in 1836, has been untouched for two hundred years. It contains many curious rooms, to which the low arched ceilings, quaint furniture and decorations give a decidedly antique appearance. Here we find the bedroom of the Czar Michael, the former council chamber, etc., all magnificent in their way, but simplicity itself

when contrasted with the glories of the more modern Palace. From the Holy Floor the famous "Red Stairs" lead to the court below; and if those stones could only speak, what tales they could tell of the past! On this floor Ivan the Terrible received the messengers that came from all parts of his wide realm; and when they brought him bad news he pierced their feet with his sharp iron staff, or had them thrown over the parapet. Here he also stood when he saw the comet which portended his doom. Napoleon passed up these stairs. The Czars all pass over them to the cathedral of the Assumption to be crowned.

The most interesting room in the older portion of the palace is that which was formerly the audience chamber of the Czars, but is now used as the banquet room, where the Czar takes the first meal after his coronation, in all his insignia and surrounded by all the great ones of Russia and the representatives of all the other European Powers. In the time of Feodor the walls were frescoed, the scenes representing stories from the Old Testament; they were covered with Gobelin tapestries later on, but since the time of Peter I. deep red velvet draperies studded with golden eagles have replaced them, giving the room a comparatively plain appearance. In one corner of the room is a platform with a canopy over it, where the Czar sits during the banquet, and facing it, directly over the main entrance, is the gilded frame of a window through which the ladies of the court are allowed to watch the proceedings in the room below.

Walking along the great esplanade facing the river we enter the Treasury, a portion of the Palace which corresponds with the Tower of London, and although

each of these great collections has its own peculiar charm for travellers, no one hesitates to describe this collection as the greatest and richest collection of jewels in the world, for the profusion of rare presents is simply bewildering. We pass in through the Armor Hall, where are preserved the curious old arms and the battle flags carried or captured by the Czars and notables of Russia during the past thousand years. Many of these arms are skillfully and finely inlaid and covered with jewels. In a hall-way we find the trappings used in the coronation festivities, the thrones, baldacchino and flags of the various Czars; and then enter the famous "Round Room." In this part of the collection the interest centres in the thrones, crowns, sceptres, orbs and robes of the Czars and their rich chains and orders. Among the greatest curiosities is the double throne of Ivan and Peter I. It is made of silver, gilded, and is a piece of very skillful workmanship. Near it is the throne of Ivan the Terrible, with its 9000 gems. Here are also the captured thrones, many of them among the richest in the collection—the throne of Kazan, the ivory throne of Constantinople, dating back to 1472, the throne of Persia of 1660, with its 876 diamonds and hundreds of other jewels—all these attract attention; but one, a comparatively simple affair, the throne of unhappy Poland, will always have an especial interest for Americans. The oldest gems in this room are those of the orb and crown of Wladimir, falsely called the crown of Monomachus. This mass of jewels was sent to the Czar by Constantine with a piece of the true cross, and has imbedded in rich enamels 58 diamonds, 89 rubies, 23 sapphires, 50 emeralds and 37 other stones, all of good size, and they make it a blaze of light.

Any one of these treasures would set our museums nearly wild with excitement, but here they seem to be things common and ordinary ; nor is this all, for at the end of the series of ante-chambers we find an immense room, which is crowded with the choicest gifts to the Czar. Gold, silver, ivory and amber are there in enormous quantities and in all imaginable forms, which often serve as the mere basis or support for an amount of still richer decoration of precious stones which it is almost impossible to describe.

Descending from this fascinating spot, and crossing the parade square, back of which are the winter garden and green houses, we reach the main portion of the new palace, which contains the state apartments. The exterior of all of these buildings is somewhat tame and disappointing, but the moment we pass the vestibule and begin to climb the granite state stairway we are impressed with its magnificent proportions, and the sensation of surprise and delight is fairly overpowering. Through the ante-chamber, with its colossal crystal chandeliers, we enter St. George's Hall—the largest room in the Kremlin. It is 200 ft. long, 65 ft. wide and 55 ft. high. The colors in which the room is finished are white and gold. The ceiling is supported by eighteen piers, each of which has an artistic winding column on its inner face, while the capital of each column is crowned with a figure of Victory bearing a shield upon which are represented the arms of one of the conquered provinces of Russia. On the sides of the piers marble tablets have been placed, and upon them in golden letters are the names of the regiments that have been distinguished for valor in the various Russian campaigns, and also the names of officers hold-

ing the order of St. George, the highest Russian military honor. We cross a floor which is an artistic mosaic of more than twenty different sorts of wood, and above us are four thousand electric lights, and for once imagination deserts us, and we fail even to conceive the full glory of which this place is capable, but we have realized as much as falls to the lot of ordinary mortals. Next comes the Alexander Hall, decorated in red and gold, and constructed on the same grand scale with the addition of a handsome dome, the panels of the room being ornamented with the elegant golden salvers and salt cellars presented to the Czar upon the opening of the Palace.

Beyond this is the counterpart of St. George's Hall, but named for the order of St. Andrew, founded by Peter the Great in 1697. It is a little shorter than St. George's Hall, but otherwise the same proportions are maintained. Its walls are covered with blue silk and ornamented with gold. This is the throne-room of Russia, the throne standing at the extreme end of the room, beneath a pointed canopy richly decorated, above which gleam the arms of the Romanof family.

It is hard to break the charm and come down from such a scene to the contemplation of everyday affairs, but such is the invariable rule ; the more enchanting the dream the greater the contrast of reality. We have seen a bit of fairy land, which every charm of the mystic Russian skies has served to intensify in beauty ; and we must hope that the future of the land which has made such things possible will be brightened and elevated under the guidance of the Czar who lives among these influences, so potent for good.

FINISTÈRE: THE ARTIST'S CORNER OF BRITTANY.*

BY

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MEETING a friend one day in Paris after a long absence he inquired where I had been. "In Finistère," I replied. "Finistère!" he exclaimed, "where is Finistère—somewhere up around St. Petersburg, isn't it?" I was obliged to laugh, and suggested that he was thinking of Finland, and that he ought to go straightway to the Gare Montparnasse and take a train for the west, when he would find himself, in the course of some fifteen hours, in the locality of which he was apparently so ill-informed. This ignorance, however, of an interesting and peculiar region is not exceptional.

Finistère is the "Wild West" of France, and it is of absorbing interest, notwithstanding the absence of Indians, sky-mounting peaks or profound chasms. The natives reminded me sometimes of the Navajos of Arizona, and there is a ruggedness and wildness about the landscape that is quite thrilling, especially when we remember the habits, prevailing here as late as the second century, of crucifying prisoners of war, nailing their heads in triumph to the gate-post, or deftly forming the skulls into drinking cups with gold and silver mountings, for use at banquets and to cheer the honored

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guest ; or, on the practice existing at a comparatively recent date, of plundering vessels wrecked by accident, or lured by false beacons to destruction. Wrecks, indeed, were regarded as a legitimate harvest and were relied on as a chief source of revenue. Tradition relates that one way of deceiving the luckless mariner was to tie a light to the head of a bull, and after attaching his head to his forelegs, lead him along the rocks, thus obtaining that irregular, pitching motion given by a vessel on the wave, and deceiving the pilot into thinking safety lay in that direction.

The coast, even to-day, is a hazardous one for the navigator, though entirely from natural obstacles. Rocky and precipitous, the shore is broken by deep and long estuaries that reach back into the land to meet the rivers and swallow them up ; ragged promontories shoot out and disappear in detached rocks and reefs into the sea ; and in places the greensward and the groves almost meet the salt waves. There are few long beaches and few beaches unbroken by rocks. Inland, the country is hilly and full of ravines, rising to something over a thousand feet in two ranges of "mountains," trending east and west. The bays are thick with rocks, and all along the coast rocks jut, here and there, out of the water at high tide or at low tide, while others lurk dangerously near the surface. Navigation, therefore, is not easy, and it behooves one to proceed on a voyage only with a competent pilot. Yet comparatively few wrecks occur, as the government has thoroughly charted the dangers and keeps the coast well lighted. In making port, as many as four or five lights have sometimes to be taken into consideration at once. The Pointe du

Raz is the most dreaded place, with the Ile de Seins and innumerable rocks all about it,—a locality bearing about the same relation to Finistère, if not to France, that Cape Horn does to South America or Point Judith to Rhode Island.

The rivers and streams are rocky and swift.

The tide rises and falls in some of the bays and estuaries in emulation of the Bay of Fundy, and everywhere the aspect of the coast undergoes a great change between high and low tide. The shallower waters are drawn off completely, leaving vessels helplessly careened to await their return.

The region has been rather out of the line of the annual Anglo-American tourist wave, and altogether possesses still much of its picturesque originality and primitiveness. All over the continent—all over the world, in fact—a process of equalization is going on to-day, due to modern facility of intercourse and exchange, and wearing away peculiarities not only of countries but of individuals; an excellent thing doubtless from a humanitarian standpoint, but from the purely artistic it is to be regretted. Journey through Italy, Austria, even Spain, and you perceive everything converging toward a common standard, excepting, perhaps, language, and in Europe it is only in remote districts, in out-of-the-way corners, that wide differences exist and the habits and costumes of the olden time prevail. Brittany is one of these corners that has largely escaped the polishing or elevating process, and the crowds of tourists, because of its lack of extensive railway communications, and of its situation so far in the west. If the course of Empire is westward, the course of the indefatigable, omnipresent,

all-seeing tourist is mainly eastward, and he turns not back to "do" Brittany, but hies him on his way to accomplish the dream of his life, view the Colosseum by moonlight—and die! Brittany therefore still retains a flavor of those centuries when the Gaul was yet in power and the Druids performed their ancient rites; and, of all Brittany, Finistère retains the most, is the wildest, the most primitive, being the furthest removed from the world of Paris as it was from the world of Rome. To this extreme position it owes the ancient name of the southern portion, Cornouaille, from the Armorican, Kern-é, the horn—that is, the point or end of the earth—Finistère.

Originally, of course, this territory was as savage as the American continent before the advent of the Europeans, and the race that then occupied it is a matter of mere speculation. At the time of the Roman invasion (58 B. C.) Brittany was held by various tribes, or families, to which the general name Armorican was given, derived from the native words "ar," on, and "morik," from "more," the sea. These Armoricans were Celts, and lived in a half savage condition. Their houses were of the rudest kind. Before the beginning of foreign traffic, which was probably first carried on with the Phœnicians, from whom they learned mining and other important things, they used hatchets and knives of stone and arrows pointed with flint, after the fashion of our American Indians, but they then acquired the skill to make sabres of copper and iron. The Gauls were fair, with blue eyes, but as there are many inhabitants of Finistère to-day who are very dark, it is not improbable that tribes of Iberians, who preceded the Celts in the country, may have re-

mained and mingled with the new comers. There seems to be some difference of opinions as to the exact relationship of the Armoricans to the other Gauls. Cæsar classes them with his division, Celts, occupying at the time of his exploits the country from the Garonne to the Seine, while other writers class them with the Belgians, occupying the country further east, a circumstance which would seem to point to a mixed community, though the differences could not have been great, as the Gauls and the Belgians belonged to the same family, one merely in advance of the other in the westward march. There was no government, only loose tribal organization, of which the chief was the supreme authority in secular matters. Fighting was their main industry and recreation.

The religion, Druidism, was peculiar and primitive like everything else. The Druids were a distinct order of priests, chosen when young from the various tribes of Gauls, according to ability or influence, and educated by the older priests. Their headquarters were in the island of Anglesey, and there the initiation and preparatory study took place. Not only were they priests and scholars, but magistrates as well, and through their spiritual influence exerted almost unlimited power throughout Gaul and Britain. They were also magicians and astrologers, and officiated at the offerings of human sacrifices. Their teaching was entirely oral, and all their knowledge and records were preserved by tradition. The oak was regarded as sacred, and their ceremonies were performed in the deep groves. The mistletoe, when found on the oak, was regarded as a most holy object, and even to this day in Brittany is believed to be a pre-

ventive and cure for diseases and a developer of strength. It is now called, however, in Armorican, *Lougan-ar-groas*, plant of the cross, a name doubtless applied to it by the early Christians that they might appropriate its influence to propagate their own creed. Brittany, and especially Finistère, was the last locality in France where the Druids maintained their doomed religion. Elsewhere, they were early suppressed by the power of Augustus, but in this far-away district they continued their sacred rites and guarded their emblems of worship long afterwards, and here may be found to-day, in good preservation, numerous relics of their occupation and sway. These are principally the queer stones, called, in the language of the Breton, *menhirs*, *dolmens*, *cromlechs*, etc., which recall this early and singular priesthood and add another element of interest to the land, contrasting strangely with the elaborate crosses in the Christian churchyards. These stones are attributed to the Druids, but it is not certain whether they raised them or appropriated them from some earlier religion which they supplanted. The Christians,—doubtless in order to destroy as far as possible the connection with Druidism without obliterating the monuments entirely, as was done in other parts of France—in Brittany planted crosses on the tops of them or carved this emblem of the new religion into their sides, and attributed to them scores of legends linking them with Christianity.

Menhir, in Breton, means pillar-of-stone.

Peulven, long stone.

Cromlech, (*krom-leac'h*,) a round place.

Baraws and *galgals*, knolls of earth and stones.

Rollers, rolling or rocking stones.

Dolmen, stone table.

The dolmen is a stone, generally flat, supported by several others fixed in the ground, and the name is also applied to a group of large and high slab-like stones arranged in the form of a square, open on one side, and covered by stones above.

A cromlech is a number of upright stones arranged in circles, sometimes in three or four tiers, with a high stone in the centre, though this is not always present, and the work is then called *mallus*. At present, the dolmens are popularly termed by the Bretons "Korigan houses," the Korigans being evil black dwarfs who are supposed to inhabit them and at night dance around in the light of the moon, forcing the inquisitive to join the circle and dance till he drops dead from fatigue. Only if you carry a plough-stick—a stick that has been used for scraping the clods from the plough-share—can you enter this dance with impunity, a fact which was discovered by a laborer and his wife who, venturing one night too near a dolmen, suddenly found themselves surrounded by Korigans, and thought they were lost till they heard the song :

" Lez hi, lez hou,
Bas en arer zo gaut hou.
Lez hou, lez hi,
Bas en arer zo gaut hi,"

to the effect that the plough-stick which the laborer had in his hand protected him from injury, and he was permitted to proceed unharmed.

Another legend relates how a hump-backed red-headed tailor once drew lots with a companion to see which should venture a round with the Korigans. The one to whom the chance fell, the hump-backed red-head,

entered the presence of the dwarfs and asked permission to join their dance, which was readily granted. They made room for him and began to circle round rapidly singing;

“Di-lun, di-meurz, di-mercher,” (Monday, Tuesday Wednesday,) over and over again till the tailor grew wearied and thought it high time to make an addition; so at the moment they said Wednesday, he cried out lustily: “Di-riou a di-guëner” (Thursday and Friday). “Mat, mat” (good, good), the dwarfs shouted gleefully, and immediately asked what he wanted—honor or riches. He requested to be relieved of his deformity. He was seized, thrown in the air, and came down strong and straight, with handsome black hair. The other tailor then tried his luck. The dwarfs sang not only Monday, Tuesday and Wednesday, but also Thursday and Friday, and the tailor at a convenient moment shouted: “Disordreu a di-sul,” (Saturday and Sunday). The dwarfs halted instantly and cried “Oh! oh! oh!”

“Saturday and Sunday,” repeated the tailor.

“Oh! oh! oh! What then, what then?” cried the Korigans.

“Saturday and Sunday,” he repeated, and again they demanded what then, but the poor tailor was at a loss to proceed. “What do you want?” they asked. “Riches,” he said, and was flung into the air, as they shouted, “There you have what you deserve!” and he found to his horror on descending that he possessed the hump-back and red-hair that had been taken from his friend. The Korigans were angry because he failed to deliver them from their fate of dancing around Druidical stones till some one comes who says after the days of the week,

"*A cetu echu ou sigun*," and there the week ends. These legends occupy a firm place in the imagination of the peasants, who are superstitious, and many, even now, believers in sorcery.

While England and France were developing and emerging from the early darkness of Druidism, Brittany lagged behind, isolated as it was, and vigorously defended by the inhabitants, bold and daring, against encroachment. The name of Armorica was retained till about the middle of the 5th century, when the Anglo-Saxons drove numbers of British families out of England, who took refuge in Armorica, amongst their kindred, and gave the name Brittany to the region. The similarity to-day between the Bretons, Welsh and Irish is striking. The Welsh and Breton languages are still so much alike that a Welsh clergyman doing missionary work in Finistère assured me he had little difficulty in making himself understood before he had acquired the vernacular, which is not surprising when we remember that Welsh and Breton are both Cymric tongues, and that the language of the region is essentially the language of a score of centuries ago. Outside of the towns it is the language of daily intercourse and little French is spoken or even understood—indeed French is frequently as unintelligible as English or any other foreign tongue. In the larger towns even, where the influence of France is most potent, one hears about as much Breton as French, and it is not uncommon to meet with people in the immediate suburbs to whom French is a blank. The government has made efforts to correct this by compulsory study of French on the part of children, but yet they do not cry *Mon Dieu*, but *Ma Dua*, by first impulse, for

Breton is the language of the fireside. Generations must pass before the people all understand French, and centuries before the Armorican is eradicated, if it ever is. The sea speaks to them in their old language on three sides, and the only French contact they have is on the east, where there is a barrier of four other departments of Bretons, the two adjacent ones being strongly Breton, but the others, Ille-et-Vilaine and Loire-Inférieure, constituting Upper Brittany, being French in language and manners. The name of *Galots* was applied by the Lower Bretons to the people of these divisions because of their French affinity, a name that eventually extended to all Frenchmen, against whom there is still a strong prejudice, or dislike. Neither do the English find favor in their eyes, for if the Breton is anything he is loyal to his country, and its early struggles for independence are not forgotten.

The village papers have, many of them, a portion printed in Armorican, usually a letter discussing affairs of the day. Here is a paragraph clipped at random :

“ Ar c’hontrol a c’hoarvez er c’hêriou, lec’h ma zo muïoc’h a deskadures hag hec’h anavez guelloc’h an electourien ho dever hag ho gwiriou, pe droajou. Bars ar parresiou divar-ar-meaz, re alies, an electour na sell nemet euz mad pe interest he barres hag he hini he-unan, el-lec’h er c’hêriou, an electour a glask mad hag interest an holl, evel ma’z ê dleet ober.”

Even when the common people of Finistère learn to speak French fluently they do it with such a positive Armorican accent that it is often as unintelligible to a stranger as the Armorican itself ; and where French is comparatively well-spoken there are various differences

that betray the Breton origin of the speaker : for example an "s" sound for "ch," as. "sanger" for *changer*, and a "ch" sound for "s," by strange perversity, as *chéser* for *sécher*.

Though an English province for a long time, Brittany was not much affected by being subject to an English king. After 1429 it was an independent duchy. Then it was linked to France by the successive marriages of Anne, duchess of Brittany, with Charles VII. in 1491 and Louis XII. in 1498, but it was not till 1532 that the duchy became permanently annexed through Francis I. It was the last of the provinces to give up its independence, and as we review its history it seems rather strange that it gave up at all and did not remain, like Belgium and Switzerland, a distinct nation.

The area of Finistère is 2690 square miles, and the population in round numbers is 682,000—that is, it is a trifle larger than the State of Delaware, but contains almost five times as many inhabitants. The principal city is the well-known seaport, Brest, founded by Richelieu, with a population of 69,000 and one of the best harbors in France. The capital, however, is not Brest but Quimper (Armorican: Kemper), which was also the capital of the ancient Cornouaille. It now has a population of 14,000, and is a quaint and interesting city resting on the banks of a pretty river, the Odet, about ten miles above its mouth. So ancient is this place that the foundation is unknown, but it is considered by some as identical with Corisopitum, capital of the Corisopites, where the Romans founded a great military establishment. The history of the city begins with the birth of Saint Corentin, about the year 375, and as he is the

patron saint of Finistère, he is entitled to some present consideration. Brought up a Christian he took no part in the struggle against the Romans, but passed his time in prayer at a hermitage by the sea. He was supplied with food in a rather unusual way. From a small fish in a neighboring spring he would cut each morning a slice, returning then the fish to the water where it was immediately made whole again without wound or scar. One day Gradlon (or Grallon), the king of Cornouaille, hunting in the vicinity, arrived with his men, tired and hungry, at the cabin. Corentin carved a slice from his obliging fish and offered it with a jug of water for the royal lunch. He was laughed at, but, nothing better being available, the morsel was accepted, when lo ! the piece of fish was transformed into a bountiful repast and the water into wine. The king was so overcome by this miracle, that he threw himself at the feet of the Saint, gave him a large forest and a castle, and proclaimed him the elect of the true God. Corentin continued his labors till all the people of Cornouaille were converted to Christianity. The king gave him his own palace in Quimper, and went himself to the City of Is to live, a city which was so fine that nothing better could be said of a place than that it was Par-is, equal to Is. Tradition makes it a rich and populous city built in the basin which to-day forms the bay of Douarnenez, and protected from the sea by strong dikes, with sluice gates to let in water when required. The largest opened in the middle with a silver key which the king wore around his neck. Each month he attended in person to the opening of these gates. His palace was one of the wonders of the earth, constructed of marble, cedar and gold.

The king's daughter, Dahut, unfortunately, gloried in all manner of vice, which her father was too weak to prevent and correct, and finally, in her wilfulness, she took possession of the city and the silver key, the emblem of office. (One account says a wicked stranger took the key.) The king secluded himself in his palace to conceal his sorrow, and one evening Saint Gwénole appeared to him, warning him to fly with his faithful servants, because Dahut had opened the great sluice gate and destruction was upon the city. Gradlon, desiring also to save his daughter, took her on his horse, and followed by his officers hastened to escape. They were no sooner without the city than a fearful roaring caused them to turn, and they beheld with cries of horror, in the place of the once beautiful city, only the shimmering sea filling an immense bay. The waves rolled after them with fearful rapidity until Gradlon's attendants besought him to abandon his demon daughter to their fury. Upon this she became so terrified that a film obscured her eyes, her hands clutched convulsively at the throat of her father, she fainted and fell into the turbulent water, which, engulfing her, pursued the party no further. They reached Quimper in safety, where the king remained ever after, making it the capital of Cornouaille.*

There seems to be some evidence of the existence at one time of a town where the Bay of Douarnenez now is. I was told that walls may be seen in the deep water when the weather is favorable, but I neglected to visit the locality and verify this statement. Doubtless Mr. Ignatius Donnelly would see in this story only another trace of the lost Atlantis. It is supposed that the city

* "En Bretagne:" par Emile Souvestre.

was destroyed in the 4th or 5th century, and it seems probable that a subsidence of the land caused some such catastrophe. In a chapel which formerly existed in Quimper a candle was kept burning continuously after the disaster to prevent a similar fate overtaking Quimper, through rising of the water in a well close by. It is related that two children once had the curiosity to steal into the church, and taking the holy candle to the curb of the well there tried to extinguish it to see if the water would actually rise, in which event they intended to immediately relight the candle from another with which they had provided themselves. They were discovered in the midst of this amusement and driven away.

The country is in a backward state generally, considered from the high-pressure standard of our time. The products are varied, but agriculture does not receive the same close attention it does in other parts of France. The soil varies, here being sterile and rough, there fertile and productive, that in the north being the best. Potatoes of excellent quality are one of the chief crops, and quantities are shipped to England. At Huelgoat and Poulauouën are silver mines said to be the richest in France. Wood is the principal fuel, and when a tree is cut down the roots are usually dug out to add to the supply. Along the roads and fences, trees often present a forlorn and grotesque appearance due to a periodical trimming of boughs and branches for fuel, a harvest of fagots. Under this treatment the tree continues to thrive and yields wood for years. There is a great waste of land in the method of fencing with turf walls often more than a yard thick, and as the fields are not as a rule extensive, these numerous battlements take up

a large percentage of the available soil, and give the air of a fortification to the small lots. Often these walls are combined with the prickly gorse, and sometimes the gorse is the principal portion, forming a rough hedge. It is always rich in color, dark green or greenish brown according to the season, and with its bright yellow blossoms adds to the picturesqueness of the country. There is an old saying that kissing is always in order when the gorse is in bloom. Happily the gorse has never been known to be without blossoms. The dark gorse, the dark soil, and the dark granite foundation and boulders give a blackness to the landscape that enhances the quaint and ancient flavor of the region and contributes an element of weirdness that is intensified by the sombre gray skies, which for days or for weeks blot out the sunlight and shower a steady drizzle over the whole land, filling the rude by-roads with mud and water till they are next to impassable. If you are walking you take to the top of the earth wall at the worst places if you can, and find there a veritable *high* way. Even the cows may be seen at times wandering on top of these broad walls. In summer the foliage has a darker hue than in other parts of France, and sometimes at a distance looks positively black. This universal blackness inspired a young painter, who had spent a season there, to describe it as, "A rolling black landscape under a rolling black sky," and he tersely added, "When you want to paint it, just take ivory-black for the highlights and you're all right." Notwithstanding this, there is an abundance of deep, warm color everywhere; indeed it is the very richness of the color that gives the impression of blackness. Scattered here and there are the re-

mains of once magnificent castles, ruins overgrown with ivy, where one may pause to wonder at the transitory nature of wealth and power. The sunlight falls gently across the old gray stones, the grass is green and velvety beneath your feet, a stillness, profound, envelopes the place which once resounded with the clank of sabre and the voice of pride, and you hear the rattle of dry bones from the centuries gone—fading away into the dissolving past—freighted equally with splendor and with woe.

• The houses are all of stone, and small ones or additions are sometimes made of thin slabs set upright on the ground. Dark gray, the stone is soon covered with moss and lichens in the damp air, till there is not much difference in appearance between the house of yesterday and the house of a score of decades ago. The roofs are generally thatched, except in the larger towns, where they are made of slate or tiles. In the farm-houses, even the village houses, the floors are simply of earth. As a rule stoves are not in use, the open fireplace doing duty as a heater and a range, and the fire-place is huge—often large enough to sit down in; in fact a bench for that purpose frequently occupies one side of it. The climate is mild, compared with ours, and the people live much out of doors, summer and winter. The winter I passed there, ice formed only two or three times at night, and then merely a film over small puddles, disappearing almost as soon as the day was done; and in the summer there were few days when I could comfortably wear the thin goods that we find too warm here in July. Choice roses bloomed the whole winter in the open air. Yet the dampness made the cold penetrating, and so far as I was concerned, almost as troublesome as a much lower

temperature in our own country. Ploughing goes on in February, and the spring comes softly and gradually. Sea-weed from the shore is largely used as a fertilizer, great quantities washing up at every storm, the gathering of it forming a pleasant picture.

The farm-houses are usually small, consisting sometimes of but one room, with a loft above. Here the whole family abide, doing their cooking, eating and sleeping—a long oak table with benches serving for the board, and racks over the fire-place holding the dishes. Baking is done in ovens out of doors. The bedsteads are unique affairs, precisely like cupboards, with two sliding doors, easily closed from the inside and made of ornamental open work to admit the air. Doubtless they are the outgrowth of limited quarters, like our own folding-beds, and they seem to serve the purpose satisfactorily, but for my part I would as lief sleep in a china closet as in one of these things; yet the Breton is wedded to them, and some are almost as old as the race, having been handed down from generation to generation, together with other furniture and articles of dress. There was a time, a few years ago, when the most wonderful bargains could be made with the degenerate offspring, for carved beds, cupboards, chests, etc., and I have seen splendid things that were bought for a few francs, but now, alas! the bric-a-brac collectors have roamed the country far and wide, till nothing is to be had except at exorbitant rates. It does not appear to be the nature of the peasant to be avaricious or cunning, but as he comes more in contact with the modern world he learns to keep up with it. There seemed to me to be a simplicity and honesty about the native character that were delightful.

I remember once when I had been walking over the hills, thirst led my companion and myself to enter a farm-house that fell in our way, for a bowl of milk. Only one person there could speak French, and she, a middle-aged woman, was by no means fluent. When we were ready to go, she said the milk was two sous a bowl. I gave her a ten-sou piece, remarking that she need not bother to change it. "Oh yes, sir!" she replied, "two sous is the price of a bowl of milk and I cannot take more than it is worth," and she handed out the change. This simplicity was sometimes noticeable in other ways. A friend of mine gave a clock to a native tinker to repair. In several days he returned with it, and certainly it was going and apparently in good order. My friend was pleased, but his amazement can be imagined, when the tinker took from under his other arm a package done up in a newspaper, saying as he handed it over: "Here are some of the wheels I could'nt get in." The Breton character is contradictory, resembling in this respect that of the Irish. There is a strange mingling of kindness and cruelty, of generosity and selfishness, temperance and intemperance. There is a little rhyme of the country:

"Laër evel ul Leonardd,
Traytour evel un Treywergadd,
Sod evel ur Gwennedadd,
Brusk evèl ur Kernevadd."

"Thieving as a Léonard, treacherous as a Trégorrois, stupid as a Vannetais, brutal as a Cornouaillais," which probably depicts the weaknesses of the lower class in the various communities.

Like the rest of Brittany, Finistère has produced its

share of distinguished personages, and we have only to remember Descartes, Abeilard, Chateaubriand, Ginguéné, DuGuesclin, Lesage, Alexandre and Amaury Duval, Fréron, Geoffroy, Souvestre, Renan, Villemarqué and others, to realize to what heights the Breton character can soar.

There are no bolder, better sailors than the natives of this rock-bound coast, and the rugged soil has furnished France with some of its stoutest warriors. The sailors, especially the fishermen, are intemperate; most sailors are. The peasants of the interior are less inclined to intoxication, but all are apt to yield too freely to the temptations of Bacchus. The drink of the country is cider, of which great quantities are annually made, and to the cider is often added cheap cognac, either in the glass or the stomach, and the combination seems to make a very complete and satisfactory drunk. Then the peasant, sailor or fisherman becomes obstreperous and unruly. He spoils for combat, rough-and-tumble fist combat, however, as knives and pistols are never used, and he generally meets it early and often. Failing to find the foe, or if in the contest he is worsted, he seeks balm for his troubled soul in pounding his wife or children, who yield the house to him and make their escape if they can. On Saturday nights, particularly, the *débats de boissons*, of which there are great numbers, are thronged by noisy wrangling crowds, that rival similar congregations in the Dead Man's Gulch or Poker Flat of our own proud West. In this way the fishermen spend the bulk of their earnings, and what is left they bestow on their wives after liberal abuse. An amusing incident occurred to one of the American artists, long resident in

Finistère. A handsome, stalwart fellow he was, six feet in his stockings, fearless, and ready at any moment to administer justice with his own hand. One afternoon as he was going to his room in the outskirts of the village, he came upon two fishermen engaged in the delightful occupation of punching each other's drunken heads. Brown—I will call him Brown—took in the affair, and perceived an opportunity to end a row and help the under-dog-in-the-fight, for the upper man was plainly master of the situation. Brown in his strength and stature was able to pick up the top man by main force and hold him squirming in the air, while he ordered the unfortunate to pick himself up and be off. The unfortunate, eager to obey, scrambled with alacrity for one of his heavy sabots, which had come off in the fray, and was lying immediately at the feet of Brown and his captive. The freed man picked up this sabot, but, instead of putting it on he straightened up, quickly landed a stinging blow with it full in the face of his now helpless antagonist, and ran like the wind, with Brown after him, and the late antagonist after Brown, swearing to kill him at the first opportunity. The threat was not carried out, but never was there a madder man in all Brittany.

Probably the most beautiful portion of Finistère is that around the village of Quimperlé (Kemperlé in Armorican), and it has been called the Arcadia of Brittany. It is a pretty village of about 7000 inhabitants, and a favorite resort of artists and men of letters. A few miles to the westward flows the Aven, upon which, near the sea, amongst the rugged hills, rests the charming little town that has become so well known in the art-world that the art-students' study abroad is scarcely com-

plete without a pilgrimage there. Pont Aven may be said to have been discovered for his countrymen by Robert Wylie, the gifted American painter, who was the first to make the attractions of the place known, and whose dust reposes in the little cemetery on the hill amidst the quaint scenes he loved so well. In him a great artist died before his time, his genius but half unfolded. Following Wylie came American artists by dozens, some remaining months, some years, until there came to be what was called the Pont Aven, then the Brittany school, as other towns were found to be rich in picture material and colonies grew in numbers. It is the artists' corner of Brittany. Americans were numerous, but there came also English, Scotch, Irish, Swedes and French, till the white umbrella sprang up far and near in the green fields like mushrooms.

At Pont Aven a walk of a few yards in any direction brought one upon the diligent student with brush or pencil busy, and often several might be seen at work on the same subject. It was found impossible to exhaust the mine even in this way. The Hotel des Voyageurs, presided over by the amiable and generous "Julia," and the auberge of "Marie Jeanne," the faithful, depended almost entirely on the artists for their patronage, and from May till December they were crowded, both of them. Whoever tarried at either place got attention and his money's worth as he could get them nowhere else in the world that I have ever heard of. The fame of Pont Aven in this respect is not recent, however, for many years ago a Breton remarked that if he had three hundred écus income he would live in Quimper, two hundred in Carhaix, but if he had but one hundred he

would choose Pont Aven, where butter cost no more than milk, fowls than eggs, and cloth could be had for the price of green flax.

The dining rooms at both the hotels in Pont Aven are panelled with sketches painted by the numerous guests till little of the original wall is visible. Amongst the American painters who have lived in Finistère are Messrs. Swift, Nicholls, Bridgman, Grayson, Hoeber, Shean, George Gibson, Field, Rosenberg, McDowell, Edward Simmons, Coffin, Hamilton, Chadwick, Woodward, Smith, Penfold, Birge and Alexander Harrison, Goater, Mosler, Vail, Bolton and Francis Jones, Denman, Picknell, Edgar A. Ward and Thos. Hovenden. The majority of these were in Pont Aven. The effect of the Brittany life may be discerned in the work of these men, an honesty, vigor, and rugged straightforwardness in the attempt to do justice to the largeness of nature by direct study, rather than belittle her by conventionality and the finical puttering of the studio. In the land of the Bretons, at least in Finistère, the artist is free, too, from the annoyance of active and predominating commerce, fashion and expense. Commerce is apparently subordinate to living, and is carried on as a necessity, not as the prime object in life. Fashion throws off her gewgaws and the mantle of display at the frontier, and enters humbly with wooden shoes and a *béret*, thinking not so much how this or that garment looks as of its adaptability and comfort. This breaks the shackles of expense at once and enables the struggling student to make his old coat last almost indefinitely, for when it grows too rusty the village tailor will turn out the other side of the cloth for a small sum and the coat

is new, with the single disadvantage of having the upper pocket and sometimes the buttons on the wrong side. With good strong cloth this process can be repeated time and again, for each turn will find the other side fresher. Provided with a pair of sabots costing only a few francs he is well-clothed, and at the *auberge* he has a room and board for fourteen dollars a month.

The Aven yields in season fine salmon. Its rapid descent furnishes power to numbers of grist mills, many of them queer old buildings with water-wheels of the commonest type, straight, narrow, moss-covered paddles, close against the gray wall, turning merrily in the crystal current with a quick-running rhythm that recalls Jensen's pretty little composition for the piano. The grass is as green as the grass of Erin, and the bubbling water rushes through channels in the rich sward in places, its soft music a soothing lullaby in the quiet air to the high-strung American nerves. So many mills are there that some one once described the place as a town composed of twenty-one buildings,—twenty, mills. Pont Aven is now not alone the resort of artists, but its attractions are appreciated by others. So with Concarneau, ten miles north-west, one of the old towns of Finistère, at present a place of about 5000 inhabitants, including the old fortified portion, the Ville Close, which occupies in a bay an island entirely surrounded by massive ramparts of granite fully 30 feet high. The Ville Close is about a quarter of a mile long from east to west, with one principal street. Access is had by three gates, the one toward the main land being reached by a draw-bridge, while another at the further end opens on a rocky, deep inlet called the Passage. A ferry in the

shape of a yawl sculled by one man puts the traveller across the swift-running tide for the sum of one cent, and shortens his walk to Pont Aven by a full mile.

The town is a well-preserved specimen of its kind, the walls having been several times strengthened and repaired, most extensively near the middle of the 14th century. It has always formed a refuge on the coast, and it is said that in the 15th century it was the retreat of thieves and villains of every description. Happily the population is different now, and the place is the home of fishermen and sailors whose great sin is drinking too much fire-water. The newer portion of the town is one of the most important places in the sardine industry on the coast, because it is just at this point that the sardine attains the most desirable size, in its northward journey, for packing, and the taking and preparing of them is the chief industry. Sardine fishing begins in May or June and sometimes lasts as late as November. Boats come from Douarnenez to take advantage of the early run and, as the season wanes, return. At times there are as many as 1200 boats engaged here in the pursuit. These boats are about 30 feet long, entirely open except a short deck at the stern, and carry two masts that can be readily taken down. The sails have no booms, and whenever a tack is made, they have to be run down and put up on the opposite side of the mast—the windward side. When at work the rigging is sometimes completely cleared away, so that the boat has no appearance of being adapted to sails. It is then pulled along by huge sweeps. The fish are not caught by enclosing them as when a seine is used, but the net, which is of small mesh and made of linen thread, often dyed blue to render it

less apparent in the water, for the sardine is wary, is made to trail straight behind the boat. That is the net, about 20 feet long and six or eight feet broad, is weighted on one long edge and buoyed with cork floats on the other, so that when it is in the water it assumes an upright position like a wall, and it is towed in this position through the water, by one end, as the boat is moved slowly along. The patron mounts the little deck at the stern with a bucket of bait called *roug*, the eggs of the codfish, under one arm, and his keen practised eye ranging the wave. He scatters a little of the *roug* on one side of the net when he discovers the proximity of the fish, and they rise in a shoal to take it. This is the critical moment. He throws a quantity on the opposite side, and the fish, making a dash for it, are entangled in the meshes. When the sardines are numerous the boat does not halt to take the net on board but by giving it a certain pull the meshes are tightened, and with a buoy to mark it, it is cast off and left till a full catch is made. So many fish have been known to entangle themselves that their weight carried the net down and it was never recovered. Another net is immediately put out and the operation is repeated till the nets are all used. Then comes the picking up and the extraction of the fish, the latter work being performed with great care because handling the fish injures them. The net is caught up at the ends and see-sawed till all the fish drop into the bottom of the boat, where they remain till the arrival in port.

You linger on the pier at evening and watch the return. The brown-red sails sweep past into the harbor under the century-worn battlements, till all the air is

luminous and the sails coming out of the misty horizon turn crimson, speeding the dark hulls over a crimson sea. The color dies away and the boats come down upon you like spectres ; the imagination is set free to the music of the tide breaking gently at your feet. The mind runs back into the past, and sees in these dark wings the leathern sails of the Veneti who some twenty centuries ago ruled this wild coast from the mouth of the Loire to Brest, and considered themselves invincible by land or sea. They are congregating for the conquest of the Roman host on the morrow. These are the oak-built craft in which, brave and bold, they breasted the waves of the Bay of Biscay, and even of the British Channel, and here behind us in the Ville Close we perceive one of their villages built in such manner that the high tide cuts it off from the main land, making it impregnable. They knew the coast ; they knew each one of the dark rocks under the shining sea, and what had they to fear from the landlubber Romans. Ah ! strong and daring Veneti, you knew not the strategy of the great Cæsar, who, to-morrow, in eight short hours, sends your craft to the bottom and annihilates you forever.

The gloom and the mystery deepen ; the lighthouse far out on the island of Penfret flashes its warnings around the horizon, and the gray nightfall seems to undulate with the heaving sea in unison with your dreaming. Even the solid pier seems afloat. But you are recalled by the voice of a girl calling to her lover in the gliding boat, or the shriller tones of women shouting the price of fish, at this or that factory, of which there are more than a score in Concarneau, employing hundreds of hands, especially women and

girls. As the fish must be packed immediately on arrival, the factories are often idle the whole day while waiting for the boats to come in, and it may be near midnight before they arrive. Immediately there is a great stir on the digue. The foremen of the various houses open their little wooden offices, about as big as bathing-houses, and the bargaining, purchasing and scoring go on. When a sale is made, the fisherman goes back to his boat and the counting out begins. The fish are counted by the two hundred into coarse baskets, and dipped in the water beside the boat to free them from loose scales and other matter which may have accumulated during the journey in. This settles to the bottom of the basin where the boats lie, and accumulating there, together with other refuse, forms a deep, slimy, odorous mass which, when the tide is out, loads the breeze from the sea with a stench at times almost unendurable.

But one becomes accustomed to foul odors in Brittany to such an extent that he can stand anything. Odors are the objectionable feature of the country. These prevail most extensively around the towns, especially in fishing towns like Concarneau and Douarnenez, where the boiling-oil in the factories contributes no insignificant fragrance. The factories, however, are kept neat and clean, and to one who grows accustomed to the smell of oil there is nothing disagreeable. The fish are thrown on long, low tables, on each side of which is a row of women and girls who, with a dexterous use of a short knife, prepare them for the salt vats, where they remain for two hours. In the interval, if a fresh lot fails to arrive, the girls go outside and dance in a circle and

sing. When the fish come out of the salt they are placed in coarse baskets and given a bath of sea-water under a pump provided for the purpose. Then they are put out to dry in the open air, in the sunlight if there is any, on wire racks with a long handle perpendicular in the middle. These racks hold several dozen, and when the water has dried and the fish begin to shrivel, the rack is taken to the oil-room, where four or five tanks of olive oil are constantly boiling. Each rack is plunged for a moment or two into the hot oil and then set aside to drip, after which the fish are selected and carefully laid in tin boxes of various sizes. Fish that fall below the standard are placed in boxes that are to be marked to that effect—or rather bear a brand that will distinguish them to the initiated from the first quality. As a rule a catch runs about the same, but if the boats have been tardy the fish are not so good. When the box is full it is passed along to the oil-tap where the space remaining is filled with oil, the quality of which varies with the factory and the grade of fish. In some factories olive oil of prime quality is exclusively used ; in others there is about it a suspicion of “the land of cotton, cinnamon seed and sandy bottom.” The box is now ready to seal and passes along to the solderer, who sits at a long table, with a number of others—a table so arranged that the waste oil falling upon it is collected below, to be filtered and used again. The soldering-iron, instead of being heated by charcoal, the old-fashioned way, has a gas-jet inside of it, supplied by a flexible tube connecting the handle with a pipe under the table. The solder and the iron being applied to the edge of the tin cover as it is pressed into position, there is a great spluttering of oil

and the fish are at last effectually and permanently caught. A hole is then punched in the cover with an awl to let out imprisoned air, and immediately closed with solder. Next the cans are placed in a huge iron crate and lowered into tanks of boiling water. If there is air in the can it will explode or bulge out, and can be detected and corrected before the final packing in wooden boxes for export to all parts of the world. The sardine is served during the season at the Concarneau hotels so often that the visitor becomes most intimately acquainted with this particular fish, fried, boiled, canned and every other way. But they are always palatable, though in my judgment best after being canned for two or three months. The port is also frequented by craft that cruise along the coast after the tunny.

The sprat is a kind of fish that resembles the sardine enough to be his brother, but he is not half so good and he is much more numerous and easy to take. When sardines are scarce, and even at other times, sprats are packed and sold for them. One firm had a contract to supply the French government with a large number of sardines, and ruined themselves by trying to palm off sprats instead, because the profit would have been greater if the fraud had not been detected. The sardines some seasons are late coming and sometimes do not come at all. Then the factories and the fishermen are idle and the firms of Nantes and Bordeaux are blue. Another season the run is fine and everybody is rich and happy. More than a hundred millions of these fish were boxed during the season I was there. The captain of a boat makes money fast when fish are plenty, and if he is thrifty and temperate he soon owns his own craft and lives comfortably,

but the drink habit is too common and keeps them down. There are usually three men and a boy to each boat, besides the patron, and with 1200 boats this makes a grand total of 6000 individuals engaged at times in taking the fish. They live in their open boats most of the time, their principal food being bread and butter made into a soup, often with a little fish added, in preparing which they build a fire on some stones on the bottom of the boat, suspending the pot over it by means of an oar or pole resting on the gunwales. The soup is eaten out of earthen bowls, and a pipe of tobacco finishes the repast. For shelter they lower the foremast across the other at an angle of forty degrees, and drawing one of the sails over it drop the ends over the gunwales, forming a tent or cabin, where they stretch out on the thwarts and sleep as the boat rides at anchor, ready to take advantage of the morning tide. Several hundred boats arranged in this way are often grouped at evening just off the shore, forming an encampment on the sea, whose fires flicker and flash in the gloom, suggesting gypsies, Indians or pirates waiting for a favorable moment for a land raid. Fire is largely obtained by flint and steel and is preserved in a fire-horn—a common horn with a bunch of tinder at the bottom and a close-fitting cover. In this the fire smoulders constantly, responding quickly when opened with a red glow. The use of flint and steel is not confined to Brittany, however, as even in Paris they are on sale at the tobacco shops. Matches are far dearer than with us.

The principal grounds for sardines near Concarneau are around the Iles de Glenan, a number of low rocky islands about ten miles off the shore. Especially be-

tween them and the main land do the sardines abound. A chapel was erected on one of these islands, which are very small and barren, with a total population not ex-



ceeding eighty souls ; but as the people could only reach it when the weather was fair, and many invited themselves to lunch with the priest, it was not prosperous, and stands now deserted and alone. On the same island are the graves of some shipwrecked sailors. In the midst of the group on a barren rock, the Ile Cigone, there is a granite fortress dating back many centuries. The draw-

bridge is up and it is long since the bugle and the drum disturbed the grim silence.

Washing may be said to be a feature of the landscape in Finistère, because wherever you go you are likely to meet with the white-capped women beside some spring or running brook, pounding the clothes with a wooden bat as if they enjoyed seeing the buttons fly and the fibre disintegrate. These washing places are to the peasant women what the club is to the society man—there the gossip and the news of the day are garnished and interchanged. The grouping and action of the figures are graceful and interesting, and several painters have found in them subjects for their skill. Like everything else, the washing has a legend connected with it. Several women are doomed to wash their shrouds in all kinds of weather at night, till judgment day, because their relative, husband, brother, son, neglected to save them from purgatory by the proper prayers and masses, spending his time in drunken revelry instead. It is claimed the sound of their bats may often be heard if one is daring enough to venture near the washing-place at the proper hour. Evidently another story invented to point the importance of absolution and consequently the religion that met and conquered Druidism. In the story of the White Inn the same object is apparent. A traveller reaches an inn and asks for a room. He is given one the walls of which are the color of blood, and in which no one has ever slept without having his hair turned white with fright. The traveller occupies it, and as midnight sounds he is awakened by a violent shaking of the curtains of his bed. He tries to rise, but his feet touch something

cold and he shrinks to try the other side. A coffin, with candles at the corners and covered with a black cloth with white tears sewed on it, confronts him. "Who are you?" he asks. "Speak—a Christian listens." A voice replies, "I am a traveller who was murdered here by the people who formerly kept this inn; I died in sin and I am suffering in purgatory." "What do you wish?" said the bold Christian, to which the ghost answered: "Six masses in the church of Notre Dame de Folgôat and a pilgrimage by a Christian to Notre Dame de Rumengol." This being promised the modest spirit retired. One month afterward the room lost its red color, becoming white like the rest, and the ghost never returned. The traveller had kept his word.

The people are fond of ceremonies and there are many holidays. Then they appear in their best attire, some of it precious from its age and association; heir-looms treasured in the family through generations, as the old Gaul used to treasure the dried heads of his enemies. The costume varies somewhat in different localities, consisting generally of a simple cloth dress with black velvet bands for trimming, an apron, and a white collar and cap, smooth and stiff. It is considered a disgrace, or at least immodest, for a Breton woman to allow her hair to be seen, and consequently these caps, sometimes two or three in number, conceal it completely. The peasant-girls in sport attempt to pull off each other's caps as the most mischievous thing they can do. Of course the women of the upper class are entirely Parisianized in their dress and manners, and therefore are not here considered. The men and women both wear sabots. The fishermen are dressed in ordinary clothes, their heads cov-

ered by the *béret*, a cap like the well-known Scotch cap, but the landsmen wear broad-brimmed hats with black velvet bands that hang down behind in long ribbons, giving a strangely infantile aspect to the otherwise rather grim person. Their blue coats come to the waist, and are trimmed with black velvet and brass buttons, and usually have no sleeves, the latter being attached to the waistcoat, also trimmed with brass buttons. The trousers resemble those of the Turk, but are white, not red. They are held in place by a belt or sash at the waist, and at the knee by leggings or long stockings. Formerly the men wore their hair long but this is not now the custom, though old men adhere to it still. The dress of both men and women varies much in ornamentation, that of the women being often highly elaborate, but invariably adhering to the patterns laid down by their ancestors, and never made over into a different style. Once good always good. They are far from being ashamed of their costume when they go out into the modern world, and when they visit Paris, if they ever do, they make no change in their dress, nor in their manners, which remain simple and unaffected. In walking the Breton has a habit of folding his arms instead of swinging them, as most people do; and sometimes he utters a yell that would put a Comanche to the blush, and which drifts and echoes amongst the hills for miles. Rest for a few moments on any elevation on a fair day, and all around you at intervals here and there resounds this savage yell like a war-cry.

The principal religious ceremony, partaking in these days somewhat of the nature of a fair as well, is the *Pardon*, occurring at the different churches and chapels

on the saint's day to whom the structure is dedicated, and attracting people from all the country round. It has been illustrated in Meyerbeer's well-known opera, the *Pardon de Plöermel*, or *Dinorah* as it is called in English; and Jules Breton and other painters, have pictured it in various ways. In former times indulgences were granted to sinners on these occasions, and the benefits and efficacy of a Pardon are still firmly believed in. Women attend them to pray for the safety of husbands or fathers abroad or on the sea; and when sailors are saved from wrecks, by means of these prayers, they come in person to make the tour of the church on their knees, bringing sometimes a fragment of their ship, the garments they were saved in, wet with sea-water, or a miniature ship, as a commemorative offering to be suspended by a cord from the roof. Few churches or chapels are without one or more of these little boats swinging in mid-air.

I well remember the first Pardon I attended. There was a small, lonely chapel on a by-road about two miles from the village, the chapel of St. Jacques, a forlorn, tumble-down stone structure standing in an isolated position near an arm of the sea, the door generally half off its hinges and nothing inside but a crucifix and a stone basin containing holy-water. Round about were oaks that would have charmed the heart of a Druid, and a strange, broken-down, weather-beaten stone cross in front gave an additional air of antiquity to the dilapidated building. We could scarcely see how any saint with half a grain of pride could consent to have anything to do with such a neglected place, much less to hold a Pardon there, but we had the assurance of our

vivacious and veracious landlady that the saint would be there, positively, on that particular Sunday; and we set out, following the shore of the bay, crossing the long beach, and dragging our weary frames up the rough country road that led to the locality. We were suffering from a species of malaria with which one is apt to be afflicted before he is thoroughly acclimated. The day was warm, and when we arrived at the chapel we both felt exhausted. The building had been decorated inside and looked quite another place. Candles illuminated it and several priests were holding a service of prayer, while surrounding the structure were stalls of vendors of cider, nuts, raisins, rosaries, cakes, beads, ribbons, glass and china-ware, apples, crucifixes, shoestrings, prayer-books and almost anything the peasant life demanded. These things are purchased for personal use, or for offerings to the saint, to be afterward sold by a churchwarden at auction. Some saints are particular and will accept only special offerings, as fowls of a certain color, but most of them will take anything.

Behind the chapel, men, women and children in their quaint costumes knelt in invocation, forming an interesting picture. We regarded all with weary eyes, and descended to the bank of the estuary and threw ourselves on the cool sod in the shade of a tree. Finally we gathered strength enough of will and body to go again to the chapel for the purpose of obtaining refreshment at one of the stands. Cider appealed to mind and soul, and we drank copiously out of queer blue and white mugs that looked as if they had been resurrected from some tomb, and then laying in a stock of almonds, crept to the grateful shadow of a near-by hedge, to study the Pardon

at leisure. To our surprise, in about ten minutes we felt like new men; the vigor of youth was renewed within us and we rejoiced. Attributing our recuperation to the cider and almonds, we consumed more and again felt better, and after repeating the course several times we believed ourselves healed, and went homeward with a step as elastic as the conscience of an Ethiopian. Much we marvelled at our astonishing regeneration, but on mentioning it to Madame, our landlady, she exclaimed with a twinkle in her eye, "*Mais, voilà, messieurs, vous avez été au Pardon de St. Jacques!*" Here was the whole explanation, and St. Jacques did his work well, for neither of us ever again had the slightest return of the malady. If you are ailing, therefore, seek not the springs of Saratoga nor of Manitou, nor yet swallow noxious drugs, but go to a Pardon and be permanently cured. Probably the advocates of the Faith Cure would find in this Pardon Cure much testimony in favor of their theories. Some saints make a specialty of certain diseases, but the majority are general practitioners. The fine old churches present a strange and beautiful picture during a Pardon, with the hundreds of figures kneeling on the grass and the gray walls and Gothic windows as a background, all surrounded by tall trees, with crowds of peasants, the numerous stands with their wares, and a procession headed by priests and acolytes with censers, moving slowly around the edifice.

It is also the correct thing when you go to a Pardon to take back to the women of your acquaintance who remain behind some souvenir, a shawl-pin, a crucifix, a yard of calico or what not—something to remember the Pardon by.

The Bretons love open-air games, dances and sports. After a wedding, which is a joyous affair in Brittany, as like as not the whole party will go into the highway to dance instead of trying to do it in the small rooms, and they do not object to the lingering of the passer-by to watch them. On fête days wrestling is one of the amusements, a number of the best wrestlers retiring to a grassy field or meadow, where the crowd of spectators form a large ring and crane their necks over each other's shoulders to view the great contest, which continues with changing actors for hours. Bowling is another of their games. It is played with two or more large wooden balls, and can be carried on along the road in a sort of chase-and-chase way if the players desire to walk from one town to another. But the great delight is dancing, and the clang of the "wooden shoon" may often be heard from morning till night. Molloy's well-known song might easily have been composed in Concarneau, for there are the boats and the sailors and the dance and the merry tune. The step is apparently as simple as one, two, three, yet it is astonishingly difficult to acquire. The music is usually a brisk gavotte, reminding one of Bach, furnished by two Bretons perched on top of a hogshead or table, one playing the droning *biniau*, or bag-pipe, and the other the shrill *bombarde*, or hautboy, both keeping time with their sabots on the wood. So spirited is the air that it almost lifts you up and leads you off with the other dancers in spite of yourself. The dance is usually started by several of the men joining hands and shuffling round in time with the pipes, keeping in a diagonal line. Presently more come in and more lines are formed, going round with the peculiar step,

their faces as solemn as judges. Then the women start also in lines, and after a time the lines gradually break up and re-form with both sexes in each. The movement is extremely graceful, and there is such perfect unison that the spectator is completely charmed. The air is filled with the thwacking sound of sabots, the shrill piping and the droning of the biniou, and when a line comes straight forward in full movement the effect is strikingly picturesque.

There is a certain wildness about it all that carries you back ages, like so much else in the country. Indeed the whole time in Finistère, I felt as if I had been slid backward in the calendar several centuries, but at no time was this more vivid than one evening late, when I was walking alone on the highway several miles from the town. The moon shone brightly and the way was clear. I had not met a soul for more than half an hour, and the houses here were few and scattering. The gorse hedges appeared even more rugged than by daylight and the rough uncultivated lands on each side were bleak and wild. Suddenly I heard singing in the distance; a party of peasants approaching, I thought. The singing drew nearer as I went on, but I could see no one nor could I hear sounds of footsteps. Presently it appeared to come out of the ground at my right, and I looked to see if I had stumbled upon a Korigan-house, or upon the entrance to some underground temple of the Druids. The song was one of the weird, sharp, minor-key Breton choruses, and was strangely muffled. At last I discerned not far from the roadside a small house partially hidden by the inequalities of the ground. Not a ray of light came from the interior: every door

and window, closed by solid shutters, was as blank and gray in the misty light as the walls themselves, but the dance, whether Korigan or Druid, was proceeding merrily enough inside. Women's voices took up the first part of the refrain and the men's the second, all joining on the last portion, repeating and repeating while the sabots marked time on the earth floor. How strange, and far away it seemed—that song, that dance, that language of the past, with nothing modern within sight or sound for comparison, but myself, a solitary specimen of the newest race under the sun. I listened a few moments till my ear caught the tune, which I whistled till I arrived at my hotel.

A day or two later I happened to whistle it in the presence of old Père Garro, who served us in many ways, and to my surprise he shouted, "Ah! m'sieur, you have it well—it's a true old Breton song, that is!" Poor old Père Garro! his had been a hard lot, but he had borne it patiently, like the sturdy Breton that he was. We paid him (all he asked) for posing, washing brushes, going on errands, etc., the munificent sum of two dollars a week. He boarded and lodged and clothed himself, but, as we have seen, clothes are not worn in Finistère for adornment, lodging is not sought for display, and food is eaten to sustain life, not to minister to a pampered appetite. The life is in the open air and the labor is healthful and steady, without overtaxing either the muscular or nervous tissue. We are proud of our feverish haste, but after all, is it the best thing for us? The continent is yielding up its treasures, pouring them out as great rivers run, but the merchant drops dead in his counting-room, the mechanic sinks down by the forge, and the miner expires in the

darkness of the tomb, all ground to death under the wheels of the progress train, without knowing the delicious essence of the meadow breeze or appreciating the beauty of a summer sky.

The difference in activity and finish between Finistère and the United States is well illustrated by the difference in railway-building. Instead of rushing the road through and reconstructing afterwards, picking up the wrecks by the way, every detail must be perfect before the road is opened; even the substantial cut stone stations must be completed. Not much like some of our western roads, where freight cars serve as station, telegraph office, express office, even dining-hall. They build a few yards a day where we build several miles, but their few yards are done. The branch to Concarneau was nine miles long, and had been five years in construction, but it was perfect, complete as the main line itself; yet before the grand opening only the engineers had gone over it. The opening day was Sunday. The route from the station to the market-place, where a banquet was spread, was lined with flags for day and lanterns for night, and when the official train arrived, a cortege of soldiers, firemen and prominent citizens met the guests, and, headed by a brass-band led the proud way to the market hall. A sentry stationed on the ramparts of the Ville Close signalled when the procession arrived at a certain point, and the guns of a war-vessel boomed a salute. At noon the favored ones sat down to the dinner and remained feasting and speech-making till four o'clock, the band playing at intervals, while an ill-natured peasant or two prowled around the stone walls with jealous listening, cursing the French and their railways.

Dancing went on in the open square, the thwacking of the sabots and the lively music of the pipers mingling with the sounds of revelry from the market hall. At night the man-of-war fired another salute, elaborate fireworks amused the crowd, and not till a late hour was the town quiet again. The railway was finished, and in the morning went about its business as soberly as the oldest road in France.

They may be behind the times in Finistère, but they know better than we how to enjoy life; how to get a great deal out of a little. Better be rich, like Père Garro, with a few sous and contentment, than be poor like an American with the purse of a prince and the unsatisfied ambition of vanity. The Bretons are nearer to Nature than we are, and it is this, united to their charming landscape so full of mist and color, their picturesque ruins, their romantic coast and their fascinating history, that has rendered their country, particularly Finistère, so attractive to the artists of all nations, who, in these latter years, have made it their haunt and their home. Even the mills are full of grace and beauty. Faults, the Bretons have—what people have not?—and their land is not without its thorns, but the virtues predominate. You go there for a few weeks; you linger months, perhaps years, lured and soothed by the delicious seclusion from the excitement of modern life, which echoes away over yonder toward Paris, or leagues in the west across the sea; and if you venture to pass without the gates, you soon sigh for those rocky shores again, as the mountaineer in the city throng sighs for his camp-fire and the fragrance of his beloved pines.

A SUMMER'S CRUISE TO NORTHERN LABRADOR.

I. FROM BOSTON TO SQUARE ISLAND.

BY

ALPHEUS S. PACKARD.

IN the spring of 1864, Mr. William Bradford, the well-known marine artist of New York, organized a party to cruise along the coast of Labrador, and if possible to reach Hudson's Straits, for the purpose of painting icebergs and arctic scenery. After having previously spent a summer on the southern coast, with no opportunity of extended explorations, it seemed rare good fortune to make one of a party bound for the Moravian settlements, and possibly Cape Chidley.

On the 4th of June, at 10.15 a.m., the fast schooner *Benjamin S. Wright*, Captain Brown, with two pilots, Capt. Ichabod Handy of Fair Haven, Mass., for the northern coast, and Capt. French for the southern shore; a Norwegian mate and two deck hands, with a cook and two cabin boys, carrying a party of fourteen gentlemen comprising lawyers, clergymen, naturalists, sportsmen and pleasure seekers, left the Philadelphia Packet Pier, Boston. Owing to an easterly wind a tug towed us down to the Narrows, where we spread our canvas, and beat down to Provincetown for the purpose of buying a whaleboat, making harbor there at 9.30 in the evening.

Spending Sunday at Provincetown, where we visited some friends in the coast guard, several of whom afterwards distinguished themselves in the war of the Rebellion, on the 6th, with a fresh northwest wind which so effectually ruffled the ocean that nearly every man settled his account there and then with the sea-god, our course was laid for Cape Sable, which we sighted at about 1 o'clock in the afternoon of the 7th.

The following day we bowled along at the distance of 10 or 15 miles from the Nova Scotian coast, the wind blowing a fresh gale from the northwest, and about 2 a. m. of the 8th ran into Chedabucto Bay, anchoring four miles from Port Mulgrave. Weighing anchor the next day and moving up to the town, a mean little fishing hamlet, while the crew took in wood and water, each one, according to his taste, went either shopping or trouting in the rain, or geologizing. On the following day I walked towards Porcupine Point, a bold headland said to be 275 feet above the Gut of Canso. The view over the Gulf of St. Lawrence is a very pleasant one. The Gut of Canso opens into the Gulf four miles from the Point. The drift material consists of a rich soil containing bits and masses of red sandstone, some of the fragments containing calamites and the impressions of delicate seaweeds. The rocks *in situ* are a white conglomerate dipping at an angle of 80° and with a N. and S. strike.

The shores of the Gut of Canso are high and bold on the western side, but much lower on the Cape Breton shore. The contours of the hills on the Nova Scotian coast are like those of a granite-gneiss region, the hills terminating in drift "scaurs." On the Cape Breton side the houses are more numerous and the farms either more

fertile or cultivated with greater care. At Port Mulgrave the inhabitants did not raise vegetables enough for their own consumption ; and not infrequently a farmer was seen ploughing with a single ox. Exchange was \$1.95. The people were all "sesesh." Although for the disunion of the "States," nothing could separate them from the love of whiskey and gin, as in the course of the afternoon there was a miserable stabbing fray, witnessed by a good many of the inhabitants, though it should be said that there were thirty sail then in the port, from which part of the material for the affray was afforded.

Our fishermen returned with a liberal supply of trout, and Mr. Bradford shipped a steward, who turned out to be an Indian soldier, and had assisted in blowing Sepoys from the cannon's mouth. Whether he was morally and intellectually worse or better than a Sepoy was often a matter of discussion on the cruise.

We were now ready to push out into the Gulf, and the latter was now ready for the reception of the *Benj. S. Wright*. For but a few days ago vessels had been jammed in the ice immediately north of Port Mulgrave, the ice having remained later in the Gulf and been more abundant the past spring than for years. We were told that it was possible for people to walk on the ice a hundred miles out from the Magdalen Islands.

The next day found us off St. George's Bay, the sport of light, baffling winds or of dead calms, but these enabled us to receive lasting impressions of the beautiful green slopes of the Cape Breton shores, with their expanse of green sward framing the square acres of ploughed land centred by red farm houses. These were our last views of cultivated fields and well-trimmed glebes, until

on our return we beheld the rich red farm-lands of Prince Edward's Island.

Sunday the 12th was a red-letter day, spent about the home of the gannet or solan goose. At seven o'clock in the morning—and what a glorious one it was : the air soft and balmy, our good vessel's bows gently rising and falling on the swell as if saluting in a measured,

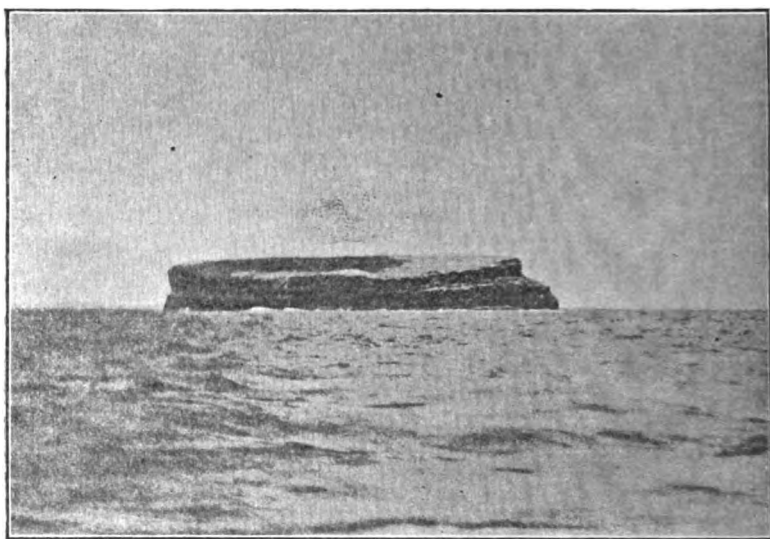


FIG. 1.—THE LARGEST OF THE BIRD ROCKS, AS SEEN IN 1864.
From a Photograph by Black.

dignified way the appearance of the god of day—at this hour Entry Island, one of the Magdalens, was twelve miles off. It is a high mass of red sand-stone with abrupt sides and surmounted by two knolls ; near it were several small islands, and a high grayish rock deeply incised by narrow valleys plunging suddenly down to the sea.

At noon we approached the Bird Rocks, a group of three islets, the largest 250 feet high and from a quarter to half a mile in length, the longest diameter extending east and west. The top is nearly flat and slopes gently towards the south. It is formed, as seen from the south side through a good glass at a distance of half a mile, of red friable sandstone, with thin beds of grit, which near the water's edge are several feet in thickness, while several loose fragments look like boulders, though there are no true transported rocks on the island.

The islets were nearly white on top, and I supposed this was due to the guano, but Mr. Bradford assured me that the white frosting, as it seemed to be, was the birds themselves—and sure enough, except a central patch of brown and green herbage, the western end was in part, and the eastern half of the island entirely white, with female gannets resting on the rock above as well as on the larger shelves on the sides, while the small nooks and shelves of grit were appropriated by myriads of murres.

At the report of a gun swarms of birds would rise and flutter in the air like flies from the rock, and at least 10,000 were there. To the leeward many gannets, males, were seated in the water, or flying over it, in company with a few murres—but nearly all were as if in ceaseless motion, and busy, fishing or returning with fish to the avian metropolis.*

* In this connection it is interesting to read the description of the Bird Rock in Cartier's 1st voyage.

“Wee went southeast about 15 leagues, and came to three Ilands, two of which are as steepe and vpight as any wall, so that it was not possible to climbe them; and betweene them there is a little rocke. These Ilands were as full of birds, as any field or medow is of grasse, which there do make their nestes; and in the greatest

Mr. Bradford spent a busy day in sketching the unique scene, and his photographer, Mr. Pierce, from Black's studio in Boston, took four good photographs of the rocks and birds. These rocks are the remnants of what were once vastly more extended strata, and the question arose in my mind whether the red soil of Port Mulgrave and vicinity were not the *débris* which had been in part borne from the Magdalen Isles, and in part from Prince Edward's Island.

Since 1864, when the photograph was taken by Mr. Bradford of which the accompanying sketch is a reproduction, great changes have come over the famous gannet rookery of Bird Rocks. Mr. W. Brewster, who, with Prof. Hyatt and others, visited these rocks in 1881, says in his account: "In 1860 the number of gannets breeding on the *top* of Great Bird (then uninhabited), was estimated by Bryant at about 'fifty thousand pairs,' or one hundred thousand birds. In 1872 Maynard found this

of them there was a great and infinite number of those that wee call Margaulx, that are white, and bigger than any geese, which were seuered in one part. In the other were onely Godetz, but toward the shoare there were of those Godetz, and Apponatz. We put into our boates so many of them as we pleased, for in lesse than one houre we might have filled thirtie such boats of them: we named them the Ilands of Margaulx. About five leagues fro the said Ilands on the west, there is another Iland that is about two leagues in length, and so much in breadth: there did we stay all night to take in water and wood. That Iland is enuironed round about with sand and hath a very good road about it, three or foure fadome deep. Those Ilands have the best soile that euer we saw, for that one of their fields is more worth then all the New land. We found it all full of goodly trees, medowes, fields full of wild corne and peason bloomed, as thick, as ranke, and as faire as any can be seene in Britaine, so that they seemed to have bene ploughed and sowed. There was also a great store of gooseberies, strawberries, damaske roses, parseley, with other very sweet and pleasant hearbes. About the said Iland are very great beastes as great as oxen, which have two great teeth in their mouths like vnto elephants teeth, and liue also in the sea. We saw one of them sleeping vpon the banke of the water; wee thinking to take it went to it with our boates, but so soone as he heard vs, he cast himselfe into the sea. We saw also beares and wolves; we named it Brions Iland. (Hakluyt, iii. 254.)

portion of the colony reduced to about five thousand birds (a lighthouse had been erected on the summit of the rock and several men were living there). When we landed in 1881 the top of the rock was practically abandoned, although there were some fifty nests at the northern end, which had been robbed a few days before, and about which the birds still lingered."

Mr. Brewster says, however, that the common guillemot (*Lomvia troile*) still breeds at Bird Rocks in amazing numbers, but that the number is rapidly decreasing, owing to the introduction of a cannon which is fired every half hour during foggy weather. "At each discharge," he says, "the frightened murre fly from the rocks in clouds, nearly every sitting bird taking its egg into the air between its thighs and dropping it after flying a few yards. This was repeatedly observed during our visit, and more than once a perfect shower of eggs fell into the water around our boat."

At 6 o'clock this evening we were 95 miles from Little Mecatina Island, and at 11 o'clock of the next day (the 13th), we sighted land lying under a mirage which looked like the land itself, while the snow banks ashore were transformed into icebergs floating in the *quasi* sea. This singular mirage lasted until evening. As the land gradually "hove" in sight the mirage receded and the bergs became veritable banks of snow. Little Mecatina was passed at 6 in the evening; its longer diameter was north and south, and the southern end of the glaciated island showed finely the "stoss" side, the "struck" side gradually sloping towards the north. The Labrador coast at this point becomes high and bold, presenting a continuous front to the Gulf,

with an occasional "hump," rising perhaps 300 feet or more above the general level of the land. The Island of Mecatina is 685 feet above the Gulf, Cape Mecatina being the highest land from Mingan to Bradore.

We dropped anchor in Sleupe harbor in Gore Island, after the quickest voyage Capt. French had ever made. The run from Boston had been a fine one, northwest winds throughout, and no fog. At sunset the thermometer was 42°, and it grew still cooler as we ran into our harbor, which was on the southern exposure, on which were numerous snow banks in the deep gulches leading down to the water.

The rocks were red syenite, like those of Mt. Desert, Me., with its characteristic hummocky outline and precipitous walls fronting the sea. No boulders were seen about the harbor, but the rocky shores were marked and polished by the ice for a few feet above the water's edge.

The murre and saddle-backed gulls were now just hatching, while the eider ducks were beginning to lay their eggs. The curlew berry was now in flower. In the garden of one of the settlers (Michael Canté), who were French Canadians, the rhubarb or pie plant was just above ground, the parsnips were six inches high, and the grass about the houses was four inches in height, but as yet there was no verdure on the hills, the surface being still sere and rusty, the snow having so recently melted away. The season opens here the middle or last of May, when the snow mostly disappears. The ice left the bay the 20th of May, and about this date the black bear comes out of his winter quarters. It was too early for cod or salmon, and the capelin had not appeared.

Our harbor was between two islands, and on one were two houses, and on the other five, one of them a well-built, neat house. About them lounged several Esquimaux dogs. We dredged in ten fathoms on a rocky bottom, not however bringing up any novelties, though the animals were all of purely Arctic types.

June 14 was spent in egging and in collecting insects. Mr. Bradford secured the services of a Frenchman and his sail-boat, and with several others of the party landed on three islands situated four or five miles away. We found eight nests and twenty-five eggs of the eider duck, with those of the murre or guillemot and auk, besides three gull's eggs, probably those of the saddle-back. We also found a nest of the red loon : it was situated on the edge of a small pond. The nest, partly submerged, was fourteen inches in diameter and in size and appearance like the gulls' nests, though the latter were placed in dryer localities. The eider ducks' nests were abundant, as were those of the razor-billed auks, but those of the murres were even less common. The eider ducks ten years ago were extremely abundant, but the unremitting attacks upon their nests by "eggers" has resulted in the partial extinction of this valuable and interesting bird. All the eiders were busy in making their nests and in laying their eggs. The old or completed nests contained a great mass of down, and were 12 to 15 inches in outside diameter, the downy mass in which the eggs sank being five or six inches high ; the newer nests were without down ; there were about five eggs to a nest. Most of the nests which we saw were built on low land, near pools and not far from the sea water, in a dense thicket of dwarf spruce trees, called "tucking bush" or "tuckermel." The

murres and auks, as is well known, do not make nests, but drop their eggs under projecting rocks, or on overhanging shelves on high cliffs, or under blocks of granite. I found one murre's egg which had been laid on the ice under a huge rock, and as I worked my way under the rock to get at the single egg, the stupid bird did not fly, but simply moved a few steps beyond my reach, making an odd guttural noise. It need scarcely be added that the vicinity of a murre's or auk's nest is filthy in the extreme. The egg-shell of these nestless birds is very thick, so that they may roll about or drop down without breaking; why they are so much more conical or pointed at one end than usual I leave to others to answer. We also saw a king eider flying with a small flock of eiders, as well as several "shags" and a northern phalarope.

Insect-life was now stirring; the pools abounded in water boatmen (*Corixa*), and whirligig beetles (*Gyrinus*), while a species of feathered gnat (*Corethra*) was just leaving the pupa, the cast skins of the latter floating on the surface of the pools. A lonely humble bee was flying fussily about, a syrphus fly was hovering over the flowers of the cloudberry, and other insects were found under stones, amongst the moss or in the water. The appearance of insect life corresponded to that of Southern Maine at the end of April. The next day a white-faced wasp (*Vespa maculata*) flew aboard the vessel. The day was spent in searching for eider nests, of which I found a dozen in the "tucking bush," with thirty eggs, and the rude nests and eggs of the saddle-back gull.

June 16th was a beautiful day, rather warm, with light winds from the east and south or quite calm. In the afternoon a shower passed over from the west,

and at night the wind was northerly; the southwest summer winds had not yet set in, the prevailing winds being northerly. We spent the day in a search for the eggs of the "waupigan" or common cormorant, and those of the shag or double-crested cormorant, William, a very intelligent French Canadian, taking us to their nesting place in his row boat. The nests were situated on a high cliff, a sort of shelf. We let William down over the precipice with a rope. There were fifty-five nests in all, and over them rose flocks of cormorants disturbed at our coming; they were very shy and flew rapidly far off, wheeling about in circles, but not daring to come near the nesting place. There were five eggs in a nest; the latter were about 20 inches in outside diameter, built of thick birch limbs, whitened, as was the rocky shelf, with the excrement of the birds, and the entire neighborhood was pervaded with a far-reaching and intolerable stench of decaying fish. The eggs of the common cormorant are said to be laid earlier in the season than those of any other bird; they are long, pointed, and of a dirty tea color, some nearly white. The shags' nests, mixed with those of the waupigan, were situated in another place adjoining. They are usually laid on the bare rock, and William was surprised to find them on the precipice. The eggs are smaller than those of the common cormorant, are whiter and more pointed, and are laid later than those of any other bird.

On our return we went by invitation into William's house; his children were attractive in looks, with fine eyes. This family and a neighboring one were the two leading French Canadian families on the coast. They told us that it was harder to gain a livelihood than

heretofore, the game and fish getting scarcer. Still, one family winter before last shot 1100 partridges. William, by the way, told us that there were four varieties of partridge, the spruce partridge, and the white or ptarmigan, of which they distinguish the mountain ptarmigan and the river ptarmigan, the latter the rarest; the fourth kind they call the pheasant. The partridges were said to be now laying their eggs. William raised last year twenty-five bushels of potatoes, also turnips, while barley, having three months to grow, ripens on this inhospitable coast. Sheep might be raised; there were no cows, though to the westward they are kept the year through. We were told that a walrus was killed near St. Augustine within twenty-five years, and that two had been seen in this vicinity since then. It will be remembered that the walrus formerly abounded in the Gulf of St. Lawrence, having been rendered extinct by the early fishermen on the Magdalen Islands.

We saw an eggging vessel at a distance. The "egggers" watch their chances to take great quantities of eggs of sea birds, especially those of the eider duck and murre. But there are now few who follow this illegal and nefarious occupation. Twenty years ago the business was at its height, and a schooner would load a cargo of 65 barrels of eggs and take them to the States or up the St. Lawrence river to Quebec or Montreal. Of late years they would give half of what they found to the settlers on the coast as hush money. When collecting the eggs they would make "caches" of them, covering the heaps with moss; and if they were on the point of being caught they would smash the whole cargo of eggs rather than be seized with them. Many are the adven-

tures which the eggers have passed through, and the stories told of them rival the tales of smugglers and privateersmen on more favored shores. They still collect and wantonly destroy the eggs of murres.

The eggs of the eider ducks we found to make a good omelet, but those of the murres and gulls were too fishy to be palatable; the food of the murres and puffin as well as gulls consisting largely of small fish, such as capelin and lance fish (*Ammodytes*). We saw male eiders two years old; they were brown with a little white; we were told that the eider is four years in arriving at maturity; the guillemot only two years; the puffins and murres becoming adult in one year. The eider duck is easily domesticated, and the young will follow a person to whom they are accustomed like a dog.

As soon as our vessel came into shallow water,—and in our boat excursions we were constantly impressed by the transparency of the water on this coast—we could look down for thirty or forty feet and see with distinctness the bottom, with dark masses of sea-urchins and the starfish. The water is more transparent than on the Florida coast. Indeed the fishermen sometimes complain of this property of the water, saying that the fish can see the nets too readily and do not enter them. The water is so clear that the ctenophores *Idyia roseola* and *Pleurobrachia*, as well as another kind I could not secure, were beautifully distinct far down in the pellucid depths. Fishing had begun at this locality to-day, the cod having struck in. It is evident that the ice having disappeared for nearly a month the water inshore undoubtedly had grown warm enough to allow the cod and other fish to come into shoal water and spawn. It was evident that as the sea-

son opened later and later from south to north, the movement inshore would be later and later from south to north, and this fact has undoubtedly given rise to the popular impression that the cod and other fish migrated from the southern to the northern portions of the coast of our continent.

I anxiously questioned William as to the nature of the interior of Labrador. He told me that there were plains and terraces inland; that there were toads and frogs and "lizards," which being interpreted undoubtedly means the salamander, most probably *Plethodon glutinosa* of Baird. He had been here twenty years before he saw a grasshopper, but this was not on the coast, but in the interior, and I know scarcely a better criterion of an Arctic land-fauna than the entire absence of grasshoppers on the Labrador coast, since none occur in the circumpolar regions, either treeless Arctic America, Greenland or Spitzbergen; but the interior wooded portion of the Labrador peninsula supports a truly boreal or "Canadian" insect fauna, with grasshoppers.

Among the insects found were the showy caterpillars of *Arctia caja* and a weevil. Of the more noticeable flowers there were a pink *Arenaria*, and a leek-like plant which I have often seen on the summit of Mt. Washington.

The 17th we weighed anchor, and with light winds and some rain early in the morning, but a strong northeasterly head wind in the forenoon, we made only twenty-five miles during the day. The coast along our course was of very even height, the monotonous outline being relieved by an occasional elevation. The rock was of syenite with its characteristic scenic features. It was of

warm, reddish flesh tints, but full of chinks and cracks, made by the water percolating or running into them and freezing, resulting in the cracking and disruption of large rock masses. Then the continued action of the frost year after year widens the chinks into gulches, with even, precipitous sides, now filled with snow banks ten or fifteen feet long, and sometimes a dozen or more rods in extent, their edges bordered with Arctic flowers. The hills were barren on top, with moss and dwarf spruce in the cavities or ravines. Here and there were to be seen clumps of grass, but the herbage in a Labrador foreground is not grasses or sedges, but low shrubby woody plants such as the dwarf cranberry, the curlew berry (*Empetrum nigrum*), etc., which form a dense uniform carpet of varied but dull green hues.

On the afternoon of the 18th we dropped anchor near Caribou Island, and on landing found Mr. Carpenter, the missionary of these shores, who had befriended us in so many ways while camping on this island in the summer of 1860. He was well and prospering in his good work. I lost no time in borrowing a spade and digging for quaternary fossils, and was rewarded with the discovery of several species not detected in 1860; among these were *Serripes groenlandicus*, *Buccinum undatum*, etc.

On the evening before June 20, the longest day of the year, I could read fine print until half-past eleven at night. The next morning I dredged in eight fathoms before weighing anchor, and was delighted to find several large specimens of a delicate bivalve shell, (*Pandorina arenosa*); it was afterwards dredged up the coast at Long Island in fifteen fathoms in sand

and stony bottom. It had not before been found south of the polar seas; its discovery so far south was interesting from the fact that we had found it in a fossil state in sandy strata of clay at Brunswick, Me., while it was found in the quaternary clays at Saco, Me., by Mr. C. B. Fuller. The association of this shell with *Nucula expansa* (antiqua) in the brick-yard clays gives positive proof that during the wane of the ice period the shore of Maine was the home of a truly polar assemblage of marine animals, and that then as now on this coast these shells were not confined to deep water, but lived in shallow retired bays in water not over 50 feet in depth.

Throughout the day we were in sight of the butte-like Bradore Hills, the highest of the three mountains being 1264 feet above the gulf. As these mountains overlook the scene of Jacques Cartier's explorations in the Straits of Belle Isle, we would suggest that the highest of the three elevations be named Mt. Cartier.

On the shores of Bradore Bay are still to be seen, it is said, the ruins of the ancient port of Brest, which was founded by the Bretons and Normans about the year 1500. The ruins are situated about three miles west of the present boundary of Canada at Blanc Sablon. Samuel Robertson states in his "Notes on the Coast of Labrador," "As to the truth of Louis Robert's remarks there can be no doubt, as may be seen from the ruins and terraces of the buildings, which were chiefly constructed of wood. I estimate that at one time it contained 200 houses, besides stores, etc., and perhaps 1000 inhabitants in the winter, which would be trebled during the summer. Brest was at the height of its prosperity

about the year 1600, and about thirty years later the whole tribe of the Eskimo, who had given the French so much trouble, were totally extirpated or expelled from that region. After this the town began to decay, and



FIG. 2.—THE BRADORE HILLS, THE HIGHEST PEAK MT. CARTIER.

towards the close of the century the name was changed to Bradore."

By sun-down our vessel had made only ten miles, being off Belles Amours, with a southerly and very light breeze. The sunset was a glorious one, while the moon rose through the haze and mirage over the snow banks of the Newfoundland coast. At three in the afternoon we

saw several miles ahead of us the fields of ice which we were soon to encounter, choking up the Straits, and enhanced in apparent extent by the mirage. The Labrador coast, along which we were sailing, is very bold and bluff-like, with lower points of land reaching out to us in a picturesque way, the remarkably even outline of the coast being interrupted by the Bradore Hills.

The dredge was put down about two miles from shore in from ten to fifteen fathoms on a hard stony bottom, with good success. Beautiful specimens of *Lucernaria quadricornis*, four inches in height and of a dull amber brown, came up in the same dredge with that superb naked mollusc, *Dendronotus arborescens*, which were of a beautiful amber hue, dotted with white points. From the stomachs of fishes caught by some of the party were extracted specimens of a rare Arctic crab, (*Chionæetes opilio*,) which proved to be not uncommon in from ten to fifty fathoms in the Straits of Belle Isle.

The next day, from nine in the morning until three in the afternoon, we moved slowly through the floe ice, which proved to be the outskirts of the immense fields of ice which this summer lined the northern coast of Labrador. Mr. Bradford kept his photographer busily at work taking views of the more remarkable forms. The splendid green hues, so varied and striking; the endless variety in the water-worn forms; the weird noises, now harsh and grating, now loud and roaring, produced by the attrition of the cakes of ice ground together by the slight swell or the conflicting currents, lent unending interest to the scene. The floes had evidently the air of tired and worn travellers; they had been borne for at least a thousand miles from Baffin's Bay; had been

thrown upon one another by storms and ocean currents, broken and frozen together over and over again; they were now rapidly melting away in the bright warm sun, for the water was filled with bits of clear dark ice, the fragments of larger floes. Our vessel, her sails scarcely filled out by the light baffling breeze, rose and fell, ploughing her way through the yielding floes. The water between the cakes was alive with bits of animated ice, myriads of transparent ctenophores crowding the sea from the surface to a depth of a fathom or more. The roseate *Idyia*, throwing off the most delicate reddish tints, seemed besides to reflect the delicate blues and greens cast off by the floes; an Alcinoe-like form, floating on its side, with blood-red tentacles, rose and fell among the ice-cakes, and with these in lesser numbers was that spherical living ball of ice, the Beroe or *Pleurobrachia rhododactyla*. The Alcinoe was the *Mertensia ovum*, a creature as fragile as it is beautiful. It is of a delicate pink color, with iridescent hues; the ovaries bright red, the deep purple red tentacles in striking contrast with the delicate tints of the body itself. From this point until we reached Hopedale in lat $55^{\circ} 30'$ it constantly occurred in the floe-ice, but was rarely seen in waters from which the ice had disappeared, as in harbors free from ice the *Mertensia* would keep out of view near the bottom; but as soon as the ice drifted in and choked up any harbor we were in, myriads could be seen near the surface, rising and falling between the ice-cakes, gracefully throwing out their tentacles, which were nearly two feet in length, and suddenly withdrawing them when disturbed. No true jelly-fish were to be seen; the season was early for them, but the beautiful polar shell-less snail, the *Clione limacina*

with its long wings and bright red tints was not uncommon.

Stopped by the ice early the next morning we came to anchor at Belles Amours, waiting for a change of wind to allow a passage past or through the floe-ice. The coast is high, abrupt and precipitous. Numerous streams well stocked with trout tumble into the sea, and the drift deposits, of limited extent, consisted of coarse gravels and boulders of syenite.

We looked for insects, finding nothing of particular interest, though noticing that the ants had just come out of their winter quarters. Glad enough were we to find a snail (*Hyalina electrina*), and in the mud at the bottom of the ponds a little bivalve shell (*Pisidium*); under stones in the brooks were larval stone-flies and ephemera; while a little salamander (*Plethodon glutinosus*) of a slate color with a paler light dorsal band ran into the water, to my great disappointment just eluding my grasp, as it is doubtful if any salamander occurs much farther north on the coast than this species.

Here the alders were still in blossom, showing that the season had just opened, though the shadberry, the golden thread (*Coptis*) and the bunch-berry (*Cornus canadensis*) were likewise in bloom; on the other hand the mountain ash was just unfolding its buds.

Dredgings carried on in so shallow water as four and six fathoms revealed pelicans' feet (*Aporrhais*) in abundance and very fine large *Serripes groenlandica*, and with them in the mud and sand a great abundance of nemertean and other worms, and Amphipod Crustacea, with fine examples of *Cuma bispinosa*.

The principal house-owner at this fishing station was

a Mr. Buckley, who had been out here for twelve years from Boston. To his comfortable house was attached a conservatory and garden. Though the scanty soil on this barren point looked unpromising enough, it was comparatively rich. He had built his own schooner, a vessel of thirty tons.

On the beach was the skull of a "killer"; it had recently been brought ashore and was surrounded by a number of hungry whelks (*Buccinum undatum*) which were cleaning off the flesh from the bones. The killer is the most voracious of the smaller cetaceans, and is the bulldog among the whales. The head is very blunt, the skull thick, the jaws powerful, the teeth longer than those of the grampus. It is at once known when swimming in the water by its high, narrow, pointed dorsal fin, which projects five or six feet out of water. It attacks with great boldness and pertinacity the right and fin-back whales, gouging out from their lips and side, lumps of flesh, and, as Captain Handy told me, is especially fond of the whale's tongue.

The next day we walked inland, following up the stream which empties into the Gulf at Belles Amours. We however took the wrong side of the brook and failed to see the cascade where the stream, as we were told, falls down over a precipice forty feet high; but from a hill perhaps five hundred feet high, which overlooked the country, we could trace the course of the brook for about two miles, where it ran down a steep ravine, with ponds on either side, from which flowed streams sending thin and broken sheets of water over steep precipices. The lake from which the stream issued was perhaps a mile long, situated on high land, and a foaming stream poured into

it from the northwest, while farther on in another depression was probably a second lake like the one in view. Such is an ordinary Labrador stream—a chain of ponds connected by rapids or waterfalls. There was a dreary sameness to the surface of the country, relieved, however, by a few snow banks. During our ramble we heard the familiar liquid notes of the wood thrush, and saw some coots flying over the pond. In the afternoon the wind hauled into the eastward and was followed by rain.

The 24th was misty and drizzly; the wind east and northeast. We dredged all the afternoon, part of the time scraping a coralline bottom. An Arctic sea-cucumber (*Pentacta calcigera*) was common in five fathoms in mud, with the largest *Serripes* yet met with. The most interesting form brought up was a beautiful hydroid (*Coryne mirabilis*) growing on the red sea-weed (*Ptilota elegans*). It was anchored by its stalk, with bell-shaped medusæ attached, which were provided with four pink eyes and short, thick, knotted tentacles, the pendant proboscis being very long, club-shaped and of a pinkish hue.

While lying at anchor a few boat's lengths from shore we were visited by two or three weasels, which must have swum off to the vessel. They were exceedingly tame, approaching within a foot of my finger even when it was kept in motion.

On one side of our harbor was, as at Caribou Island, a sandy beach where the fishermen could haul their nets for lance. The Newfoundlanders would come here in their clumsy boats for a distance of eight miles, where their vessels were at anchor, and seine for lance fish.

They made a great deal of noise about it, though there were only two boats; one man would stand up in the stern paying out the net, while the full boat's crew would row rapidly around the fish, and another man standing up to his waist in the water hauled in the net; in this way four barrels of fish are often caught at a single haul.

Mr. Phoenix, one of our party, here caught a young salmon eight inches long. The next day (the 25th) saw us still weather-bound with thick fog and rain, clearing up towards the evening. In codfish caught at a depth of fifteen or twenty fathoms we found large fine specimens of the lob worm (*Arenicola piscatorum*) and a fine polar shrimp (*Crangon boreas*). To-day I found the first *Cyanea* or nettling jelly-fish, the species which grows on the banks of Newfoundland by the end of summer, several feet in diameter, with long, trailing tentacles sometimes six fathoms in length; it is these feelers, filled with microscopic darts or lasso-cells, which become entangled with the lines and poison the hands of the fishermen. As yet not a common jelly-fish, the *Aurelia aurita*, had been seen.

The next day we were released from our prison; a fresh northwest wind cleared the ice from the shore, and our good ship made a fine run to Henley Harbor; time from 6 A.M. to 3.30 P.M. As we sailed out of the harbor we could see that the low point running out into the Gulf from the Laurentian background of syenite, was the western extremity of the basin of Cambrian red sandstones and grits which extend between Belles Amours and Anse au Sablon. Skirting the coast within a mile or two of these interesting series of rocks, they are seen

to rise to a height of five or six hundred feet, forming the coast line, but with a contour tame and monotonous compared with the syenitic hills of Bradore. The belt is a narrow one, and while sailing past the shore we could look up through the harbors and bays to the low conical hills of Laurentian gneiss in the interior. Passing by Bradore Bay the lofty buttes of Bradore are seen to rise up from the low foreground of red sandstone. We then passed within sight of Greely Island, where in 1856, during a severe southwest gale, so sudden and common in the Strait, thirty-one vessels for want of good anchorage and shelter were driven upon a lee shore. Parakeet Island then hove in sight, a favorite breeding place for the parrakeet or puffin, with a single house on it, the hospitable mansion of a member of the ubiquitous Jones family, where in 1860 a party from our camp on Caribou Island received board and lodging for which only thanks would be accepted.

We then sight Blanc Sablon. The land here is high and descends to the sea in five very distinct terraces, of which the second is much the highest. There were huge boulders of grit on the beach; the raised beaches were packed with boulders and the terraces in general direction appeared in perspective, as if dipping up the Strait; like river-terraces they were parallel to each other, but the lower one gradually dips down and loses itself in the water, while another dips in the opposite direction. The higher terraces appear as if wooded or green. There were indeed three shades of green; in the lower terrace the debris is covered with a pale green herbage; the older vegetation is darker, while the upper rusty green tint is very dark.

At Blanc Sablon, which was originally so named by Jacques Cartier, the settlement consists of twenty houses; they were painted white and from the vessel appeared like masses of floe-ice stranded on the shore. Of the houses four are "rooms," or fishing establishments.

We then pass the fishing settlement of Forteau, with a lighthouse on the point, besides about twenty houses, and a Catholic Church. Off the lighthouse is Shallop Island; the harbor is two or three miles deep, walled in by vertical cliffs, furrowed and streaked by rain and frost. Into the harbor empties a salmon stream; one man here seems to have the monopoly of the salmon fishery, putting up from twenty to sixty barrels a year; they are salted and sent to Europe.

Now as we pass on, the bay opens and at its head we can see the Laurentian formation, with its low, obtusely pointed gneiss hills; but the general surface of the Labrador coast is very uniform, while the opposite shores of Newfoundland now recede and appear to be much lower. The Straits are about eleven miles wide in their narrowest part.

Sailing on but half a mile off shore at Anse-au-Loup, we can plainly see that the Cambrian rocks are red and gray sandstones—that the strata, almost horizontal, dip a little to the west, descending to the Straits by three rock-terraces or shelves. A large brook here plunges in a broad sheet of foam straight down into the sea. The east side of the harbor of Anse-au-Loup is much higher than the western, the surface is irregular, and the buttressed steeps recall the Palisades of the Hudson. Then we pass along a beautiful green glacis, and on the

northwest face of the bluff are five terraces, with the sandstone strata slightly inclined. Here on the lowest bluff are to be seen four terraces (Fig. B).

In the bay east of Anse-au-Loup, whose shores seemed to be well wooded, we can again look through to the original broken Laurentian rock, and the Cambrian sandstone (Fig. C.) runs out into a low point terminating in a low, shelving, green glacia. On this

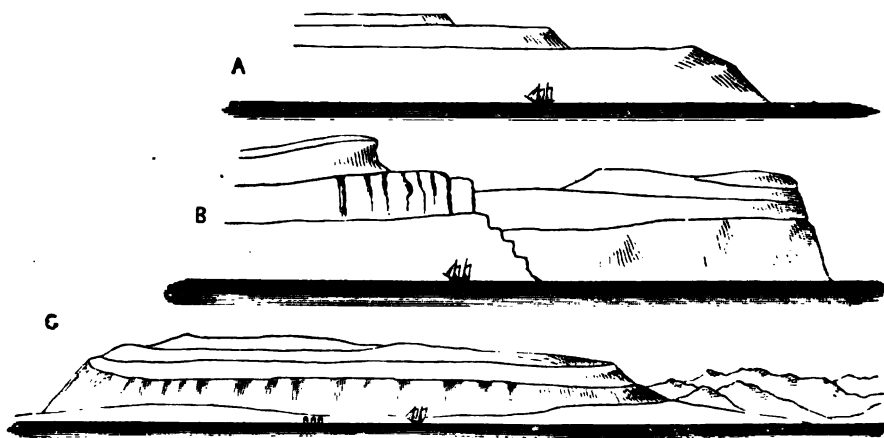


FIG. 3.—A, TERRACES AT BLANC SABLON; B, AT ANSE-AU-LOUP; C, TERRACES SEEN FROM THE MOUTH OF A BAY EAST OF ANSE-AU-LOUP.

point is the fishing hamlet of Semiditch, with but two houses.

The wind freshened off the cliffs, and now sailing on, the rough and fissured syenitic coast is in marked contrast to the Cambrian shores we had just left. Going farther on we pass from syenitic to gneiss rocks, which rise from the water in long swells.

Belle Isle, the Isle of Demons of the early navigators, now heaves in sight; the Labrador coast is more

subdued, the shores sloping to the water's edge. There are no islands along the coast, and within five miles of Henley Harbor the rock becomes entirely gneiss in character, and we lose sight of the rough, hummocky syenitic hills, though masses of flesh-red syenite are seen resting upon the dark gneiss rocks, forming a sea-wall.

Now that notable landmark, the Devil's Dining Table, appears to view, and we soon distinguish Henley and Castle Islands, the two latter like two flat oblong blocks laid by Cyclopean hands on a foundation of rock.

(To be continued.)

GEOGRAPHICAL NOTES.

THE GEOGRAPHICAL DEBATING CLUB.—Fellows desiring to join, the proposed Debating Club for the discussion of geographical questions, are invited to send in their names to

ELIAL F. HALL,
Recording Secretary,
American Geographical Society.

INTERNATIONAL MARINE CONFERENCE.—In accordance with an Act of Congress, which became a law July 9, 1888, there will be a Conference of the Maritime nations at Washington, April 17, 1889. As defined in the Act, the purposes are : “ To revise and amend the rules, regulations and practice concerning vessels at sea, and navigation generally, and the ‘ International Code of Flag and Night Signals ’ ; to adopt a uniform system of marine signals, or other means of plainly indicating the direction in which vessels are moving in fog, mist, falling snow and thick weather, and at night ; to compare and discuss the various systems employed for the saving of life and property from shipwreck, for reporting, marking and removing dangerous wrecks and obstructions to navigation, for designating vessels, for conveying to mariners and persons interested in shipping warnings of approach-

ing storms, of dangers to navigation, of changes in lights, buoys, and other day and night marks, and other important information; and to formulate and submit for ratification to the governments of all maritime nations proper international regulations for the prevention of collisions and other avoidable marine disasters."

"It will be understood by all States taking part in this Conference that no questions relating to Trade and Commerce are within the scope of the discussion, and that in the disposition of any questions which may be presented to the Conference, no State shall be entitled to more than one vote, whatever may be the number of delegates representing it."

A BROADER FIELD FOR THE UNITED STATES GEOLOGICAL SURVEY.—Prof. Persifor Frazer, writing on this subject in the *Journal of the Franklin Institute* for September, 1888, makes excellent fun of the propositions, frequently renewed, for bringing within the scope of the Geological Survey all things that are in the heaven above and in the earth beneath and in the waters under the earth.

When, however, he remarks in a semi-serious way that our country is the "broadest in longitude under the sun," he comes dangerously near to a statement of fact, since the United States really do range farther East and West than any country but Russia.

Whether the distinction of stretching so far is significant of anything is quite another matter.

TRANSATLANTIC ROUTES.—The Pilot Chart of the U. S. Hydrographic Office, for September, has the following remarks on the collision between the "Geiser"

and the "Thingvalla" on the 14th August, 30 miles S. of Sable Island :

"The Pilot Chart for December, 1887, discussed this subject of transatlantic navigation at some length, and a supplement was published, calling attention to the importance of some general understanding as to the routes to be followed by eastward and westward-bound vessels. The plan thus inaugurated has been adhered to each month since that time, one track being plotted as the southern limit for westward-bound vessels, and another as the northern limit for eastward-bound vessels. As stated last December, it is the object of this Chart to recommend only what masters of vessels may reasonably be expected to follow, having due regard to the mutual benefits to be derived from such an agreement, as well as the mutual concessions to be made in order to make it effective."

These Pilot Charts, issued monthly, contain information of the highest importance to all navigators.

A SLIGHT GEOGRAPHICAL CONFUSION.—The London *Athenæum* informed its readers not long ago that some amusement had been excited in America by the "slight geographical confusion of Massachusetts and New York" in a book of Mr. Walter Besant's. There is nothing criminal in such a blunder, but, like the confusion of England with Wales or Leeds with London, it amazes the reader. No man is required to know all things, but the writer, who professes to have studied a type of character in any particular country, is expected to have seen or heard of that country.

The *Athenæum* has ways of its own. The number

which is so charitable to Mr. Besant corrects a paragraph, evidently taken from an Italian source, concerning the royal library at Monaco and its 750,000 volumes. The correction, reproduced here by the *Library Journal* and by other papers, is worth quoting as a model of what ought not to be written : " We did not think," says the *Athenæum*, " the announcement was made seriously, or that any one would believe it, except, possibly, the Public Orator at Cambridge ; but, as it appears to be accepted as the truth and to have been widely copied, we may state that there is no library at Monaco, either royal or other."

This is meant to be final, but the Public Orator at Cambridge may take heart of grace. There is a royal library which contains not less than 750,000 volumes, at Munich, in Bavaria ; and the Italian name of that city is Monaco.

A serious literary journal ought to know something of the great libraries of the world, something of Italian, something of geography, and English enough to be aware that a principality is not a kingdom.

THE BETRAYER OF LA SALLE.—Mr. Francis Parkman, in his *La Salle and the Discovery of the Great West*, p. 405, tells in the following words the fate of the heroic explorer :

" Duhaut and the surgeon crouched like Indians in the long, dry, reed-like grass of the last summer's growth, while L'Archevêque stood in sight near the bank. La Salle, continuing to advance, soon saw him, and, calling to him, demanded where was Moranget.

The man, without lifting his hat, or any show of re-

spect, replied in an agitated and broken voice, but with a tone of studied insolence, that Moranget was strolling about somewhere. La Salle rebuked and menaced him. He rejoined with increased insolence, drawing back as he spoke towards the ambuscade, while the incensed commander advanced to chastise him. At that moment a shot was fired from the grass, instantly followed by another ; and, pierced through the brain, La Salle dropped dead." This was in 1687.

Farther on (pp. 443—445) Mr. Parkman tells how L'Archevêque and another (Grollet) were found, disguised as Indians, by the Spaniards in 1689 and sent to Spain, where "in spite of the pledge given to them they were thrown into prison, with the intention of sending them back to labor in the mines."

The history leaves the matter at this point, but Mr. Ad. F. Bandelier, writing from Santa Fe, New Mexico, under date of August 13, 1888, to the *Evening Post* of this city, says that while engaged in researches in behalf of the Hemenway Southwestern Archæological Expedition, he had discovered at Santa Clara and at Santa Fe documents which enabled him to trace with but one break the career of L'Archevêque. The first paper was an "Ynformacion de Pedro Meusnier, francés—1699." This Meusnier, it is declared by two witnesses, Juan de Archeueque and Santiago Groslee, came over to America with them in the fleet commanded by Monsieur de la Sala in 1684. Meusnier and Archeueque were in 1699 soldiers of the garrison of Santa Fe, and Groslee was a resident of that town.

Mr. Bandelier has found Groslee (apparently the sailor Grollet) as Grolle and Groli in other records, and

evidence that he lived in the little town of Bernalillo on the Rio Grande, as late as the year 1705. Nothing more has yet been learned of Meusnier.

The case is different with L'Archevêque. There is a registration at Santa Fe of a transfer of real estate in 1701 to Juan de Archibeque, a soldier. There are documents which show that he was twice married, that he became a successful trader, that he was probably the Captain Archibeque of the War Councils of 1715 and 1720, and that in the latter he strongly recommended a reconnoissance to the Arkansas River, because, among other reasons in its favor, it would procure definite information in regard to "his countrymen the French." He accompanied this expedition and was killed, with 43 others, by the Pawnee Indians on the 17th of August, 1720.

This is proved by the "Inventory of the goods and chattels of the Captain Juan de Archibeque, a Frenchman," preserved in the archives at Santa Fe. The Captain's estate, after settlement, yielded 6118 pesos to the heirs.

Mr. Bandelier adds that there is still in New Mexico a family called Archibeque, and supposed to be of French descent. The name is evidently not Spanish, and it is known that Captain Archibeque left behind him four children.

CHATHAM ISLAND.—The Galápagos Islands belong to Ecuador, and are about 600 miles from the Coast of South America. The *Washington Star*, of Sept. 8, has an account, given by Prof. Lee, of the *Albatross* Expedition, of a visit to Chatham Island, wrongly described as the largest of the group.

The island is walled in with lofty volcanic rocks. Behind these was found a fertile country in a high state of cultivation. The population numbered about a hundred and fifty persons, convicts from Ecuador, and their governor was a man named Cobos, a Spaniard by race, to whom the island had been handed over by the Government. Cobos is a man of force. No one leaves or enters the island without his permission. He has travelled, knows a good deal of the outer world, speaks English after a manner, and rules not unjustly, if somewhat tyrannically.

The people are not much like him. They have no religion to speak of, and are not constrained so far as marriage ceremonies are concerned. The sexes are about equally divided, there is an abundance of food in the country, and costume is regarded as a kind of prejudice. Most of the people are natives of Ecuador and some are half-Indian. One "full-blooded British subject" was found to be a coal-black negro, born at St. Helena. There was one Englishwoman, about twenty-five years old, with blue eyes and light hair, and, says Prof. Lee, "as tough-looking a specimen as I ever came across."

On Charles Island, which lies S.W. from Chatham, a kind of Robinson Crusoe was found in a man who had run away from companions, with whom he had left Chatham Island some years before, and had lived ever since like a wild creature. At his own request he was taken back to Chatham Island.

PERUVIAN GEOGRAPHICAL SOCIETY.—This Society, which has been formed under the auspices of the Government, held its first meeting in the Senate Hall, at

Lima, on the 15th March, 1888. A Committee was nominated to make rules.

Don Leonardo Pflucker was elected President, and Don Pedro Paz Soldan Secretary.

It is no more than just to remark that Peru has, by this step, taken the third place among South American Countries, so far as interest in geographical matters is concerned. Brazil and the Argentine Republic have set the example and Chili has her German Scientific Union at Santiago ; but the national movement in Peru must take precedence of this last.

FRENCH GUIANA.—M. Henri Coudreau writes from Cayenne to the *Revue*, of Tours, a brief account of his travels in the interior of Guiana.

He reached Cayenne at the beginning of July, after exploring the rivers Maroni, Aoua and Itany and passing seven months in the western Tumuc-Humac mountains.

He brought with him to Cayenne five Indians, among them a great chief of the Roucouyennes, whose language M. Coudreau affirms, not without malice, that he speaks as well as a member of the Academy speaks French.

He discovered sixteen new Indian tribes, and he estimates the Indian population of Upper French Guiana at 20,000. He holds advanced theories on the subject of crossing the races, and looks forward to the development of a special type in Guiana.

INTERNATIONAL CONGRESS OF AMERICANISTS.—The Seventh Session of this Congress will be held at Berlin, October 2d—5th, 1888.

The first day will be devoted to the history of the Discovery of the New World, to Præ-Columbian American History, and to American Geology ; the second day, to Archæology ; the third, to Anthropology and Ethnography ; and the fourth, to Linguistics and Palæography. In all there are thirty-seven questions to be brought before the Congress, and it is with some surprise that the reader fails to find, in the list of those by whom the subjects are to be presented, a single American name.

INTERNATIONAL CONGRESS OF GEOGRAPHICAL SCIENCES.—The Paris Geographical Society has issued invitations for an International Geographical Congress to be held at Paris, in August, 1889. There will be seven Sections :

1. Geodesy, Hydrography and Topography ;
2. Physical Geography ;
3. Economical and Commercial Geography ;
4. Historical and Ethnographical Geography ;
5. Methods of Geographical Instruction ;
6. Travel and Exploration ;
7. Cartography.

The admission fee is fixed at 20 francs for members of the Society, and 40 francs for others. Each contributor has the right to a vote, and to a copy of the Minutes and the Publications of the Congress.

It is desired that names be sent in as soon as possible to M. Maunoir, Secretary of the *Société de Géographie*, or to M. Gauthiot, Secretary of the *Société de Géographie Commerciale*.

It is suggested that each Society, taking part in the

deliberations of the Congress, present a Summary Report on the travels and explorations, as well as on the publications, which have contributed to the progress of Geography for the past hundred years in the country it represents.

THE ETHNOGRAPHY OF THE CANARY ISLANDS.—The *Bulletin* of the Bordeaux *Soc. de Géographie Commerciale* for August 6th, has a brief report of Dr. Verneau's five years' exploration of the Canary Islands. As a member of the Anthropological Society of Paris, Dr. Verneau gave particular attention to the population of the group at the time of the occupation by Béthencourt in the 15th century.

He finds in this population three elements: 1, the Guanches, who were very large and robust and with long necks, and were, he believes, identical with the Trogodytes of the South of France; 2, the Semites, who had numerous physical resemblances with the Arabs; and 3, a people of unknown origin, distinguished from both the others by their rounded heads and their small stature. The Semitic race had made greater advances than the Guanches, the stone implements and the pottery of the latter being rude and comparatively unfinished, while those of the Semites were often polished and ornamented with designs in black or red.

Dr. Verneau affirms that the people of Gomera possess a whistling language by means of which they express every kind of idea.

"My doubts on this subject," he says, "were completely removed in March, 1878, at Valle-Gran-Rey. I had had a fall, which confined me to the bed, and was

waiting for a boat to take me to Ferro; but I did not wish to leave without exploring some grottoes of which I had heard, and I decided to send some men thither. Two days after I was able to rise, and went out with my host to walk on the sea shore. All at once we heard a whistling from the mountain. My companion listened attentively and told me that my men were returning. I put through him several questions, which were answered at once. The men whistled that they had examined three grottoes and had secured for me thirty-three skulls, besides sticks and other objects. When they reached us the report was found to be exact in all its details." When these men began to whistle they were at Tejeriguete, which is $2\frac{1}{2}$ miles from Valle-Gran-Rey.

AFRICAN EXPLORATION.—Dr. Alex. Supan writes in *Petermanns Mittheilungen*, Band 34, VI, an admirable review of the progress of discovery in Africa for the past hundred years. The text is illustrated by a map which shows, marked in red, the advances made in each successive decade of years from 1790 to 1880. The first sign of an impression upon the vast interior of the continent appears in 1830, and the comparison of the map at this date with the additional map, giving the actual knowledge of Africa in 1888, is most instructive.

What remains to be done is set forth as follows :

There are three great unknown regions between 16° N. Lat. and the Equator. These are, in the W., Mandingo Land, roughly defined as the country reaching inwards from between Monrovia and the Slave Coast, to the Niger River; in the centre, the Liba region, bounded on the S. by the Ubangi River; and, in the E., the

Galla-Somali Land. The area of these districts is estimated, in the order named, at 347,505, 463,339, and 501,950 square miles.

They all lie within the circle of the interests of the colonial Powers in that part of the Continent, England, France and Germany, and, for the Galla-Somali Land, Italy also.

Dr Supan closes his paper with these words :

“ When European explorers have marked out their routes through Mandingo Land, Liba Land and the Galla-Somali country, the great period of discovery, which began with the founding of the Africa Association (June 9, 1788), will have reached its conclusion. Then first it may be said that the portions of Africa accessible to culture have been brought within our knowledge. Then the framework will have been finished, and work may be begun for the completion of the edifice.”

FROM MANCHURIA TO KASHMIR.—Lieut. Younghusband, who accompanied Mr. James and Mr. Fulford in their journey to Manchuria in 1886, contributes to the *Proceedings* of the Royal Geographical Society, for August, an account of his travels through Central Asia in 1887.

He left Peking April 4, reached Kalgan on the Mongolian frontier on the 10th and turned westward, up the valley of the Yangho, passing through a desolate country with half-ruined villages. Horrible sand-storms were of almost daily occurrence. The light soil (Richthofen's *loess*) crumbled under the slightest pressure, and the roads were 30 or 40 feet below the surrounding country.

On the 14th he reached the Mongolian steppes, now invaded by Chinese immigrants. At Kuku-choto he prepared for his march across the Gobi Desert, and started on the 26th with a Chinese servant, the camel-owner, and a Mongol assistant. For some days the country was undulating, with grass meadows and pure water. Then it began to change and grew barren and lonely, with ranges of hills like those on the Gulf of Suez and between them seemingly endless plains. Setting out at 3 P. M., the party travelled till midnight, and then encamped till the next day. The monotony and the silence were fearful, but the nights were extremely beautiful, and the stars shone out with a magnificence the traveller had never seen equalled even in the high Himalayas. Venus was resplendent, and the Milky Way was so bright that it looked like a phosphorescent cloud, or a light cloud with the moon behind it. The atmosphere was remarkably dry and so charged with electricity that in opening a sheepskin coat or a blanket a loud crackling noise was given out, accompanied by a sheet of fire.

The days were often very hot, but a strong wind generally sprang up at about ten o'clock in the morning. Rain sometimes came with the south wind.

The travellers would see rain falling heavily ahead of them, but when they reached the spot there would be no sign of moisture on the ground. After crossing the Galpin (or Galbün) Gobi and skirting the Hurku Range, the party came to the outlying spurs of the Altai Mountains.

These mountains were perfectly barren, the upper portion being bare rock and the lower composed of long gravel slopes formed of the debris. The Dzungaria

Desert, hot as a furnace, was crossed to the Tian-Shan, and on the 4th July Hami was reached. This was the first Turkistan town, and its low, flat-roofed mud houses and small shops were very unlike the large and well-built Chinese dwellings.

"If," says Lieut. Younghusband, "you could get a bird's-eye view of Chinese Turkistan you would see a great bare desert surrounded on three sides by barren mountains, and at their bases some vivid green spots." Round Kashgar and Yarkand the cultivation is more continuous than in the eastern half. The Turkis are industrious but not such good cultivators as the Chinese.

The authority of the Chinese is absolute, though almost unsupported by military force; and they rule without oppressing the people. The fear of the Chinese power is general, not only in Turkistan, but in Kashmir and Nepal, and is felt even by the Afghan and Hindustani merchants who have travelled all through India and Russian Turkistan.

Lieut. Younghusband started from Hami on the 8th July, over the route travelled by Tso-Tsung-Tang's army in its victorious campaign against Yakub Beg. On the 15th he reached Turfan, where the people live in under-ground rooms during the day, to avoid the heat. Round the town for many miles were wells, thousands in number, that had been dug by the Chinese when they besieged the place. One well, which was measured, was 110 feet deep.

On the 20th August Kashgar was reached. Here there are great numbers of merchants from all parts of Asia, and all praise the English rule in India.

The English are, by the reported Asiatic opinion,

the only people who know how to govern a country. The Asiatics must be right, for the English have the same opinion. Leaving Kashgar on the 26th Aug., Lieut. Younghusband reached Yarkand on the 29th, and started on the 8th Sept. for Kashmir. On the 15th he crossed the Tupa Dawán Pass, *only* 10,400 feet high, and beyond this the path led through tremendous mountain ranges and over glaciers, and near the second highest mountain in the world, known in the Indian Survey as K 2, and 28,250 feet in height; the upper part for about 5,000 feet being a perfect cone of ice and snow. In the absence of a native name the Royal Geographical Society proposes to call this mountain *Godwin-Austen*, after the officer who first surveyed the Mustagh Range. Mountains, like men, must undergo their fate, but conquerors should be merciful. When the old Mustagh Pass was reached, about 20,000 feet above the sea, the only way of getting down was by crossing an icy slope to a cliff too steep for a particle of snow to rest on it. Other icy slopes were below. After consultation, Wali—, “the finest fellow that ever stepped,” says his commander—quietly took an axe, tied a rope round his waist, gave the end of it to the rest, and told them to follow him. He went down, cutting steps in the ice as he went, and so from slope to slope, the party got through, and arrived at Rawalpindi on the 4th November, seven months after leaving Peking.

Lieut. Younghusband concludes from his observations during this long march through the Chinese Empire, that there is practically no military strength in China, though the material for an army is abundant and excellent; and, in the serious matter of trade in Turkis-

tan, he declares that the Russians, with their stronger, more durable and more tasteful goods, have driven the English out of the bazaars.

THE COLDEST PLACE ON EARTH.—The *Meteorologische Zeitschrift*, quoted in the *Verhandlungen* of the Berlin *Gesellschaft für Erdkunde*, gives from the calculations of Prof. Wild, of St. Petersburg, the results of recorded observations of the temperature at Verchojansk in north-eastern Siberia, up to the year 1887. The mean for each month is given, compared with that for the same month at Berlin; presumably by the centigrade thermometer, though the fact is not stated. The figures are :

	VERCHOJANSK.	BERLIN.
January	—53.1	—0.5
February	—46.3	1.2
March	—34.7	3.5
April	—15.8	8.4
May	— 0.1	13.2
June	9.6	17.5
July	13.8	19.0
August	6.4	18.1
September	— 1.6	14.9
October	—20.2	9.4
November	—40.1	3.7
December	—49.9	0.7
For the year	—19.3	9.1

The January temperature at Verchojansk is equal to 63°.58 below zero of Fahrenheit, while at Berlin the mean for January is only 31°.10 Fahrenheit. The aver-

ages for the year are, respectively, $2^{\circ}.74$ below zero and $48^{\circ}.38$, Fahr.

A minimum temperature of -60° is experienced at Verchojansk in every winter month, and even in March. The lowest temperature recorded is $-64^{\circ}.5$, equal to $84^{\circ}.10$ below zero, Fahrenheit; and the highest is $30^{\circ}.4$ ($86^{\circ}.72$ Fahr.). So that the range of the thermometer at this place in the course of the year may mark a difference of 171 degrees.

Cruel as the climate is, Verchojansk is officially classed as a city, with a permanent population, according to Reclus, of 330 persons.

THE NEW VEGETATION OF KRAKATAU.—*Nature*, of August 9, publishes a communication from Mr. W. B. Hemsley, embodying information received from Dr. M. Treub, Director of the Buitenzorg Botanic Garden. Dr. Treub visited Krakatau in 1886, three years after the volcanic eruption which destroyed the vegetation of the island.

He found the cinders and pumice stone covered almost everywhere with fresh-water Algæ, six species in all, and he collected eleven species of ferns, some of them already common.

There were also on the shore and on the mountain itself young plants of more than twenty different kinds, nearly all such as take possession of newly raised coral islands.

This is thought to be the first actual observation of the renewal of vegetation on a volcanic island.

It is a pity that Mr. Hemsley, with Mr. Verbeek's authoritative work before him, has done what he could

to increase confusion by spelling the name of the island *Krakatão*.

THE FATE OF STANLEY.—It is now more than fifteen months since Stanley disappeared from the sight of men.

Favorable and unfavorable reports and rumors concerning him have been received from time to time and discussed and forgotten ; and the world is left, after all, wholly in the dark. The mere lapse of time would not of itself be an argument against his safety and final reappearance ; but it is disheartening, when taken with the fact that his fate has been from the beginning in the hands of Tippu Tip. This man, the most powerful of the Arab slave-traders,—for, though not of pure blood, he is virtually an Arab,—is held to have been completely won over by Stanley. Admitting this, it does not follow that the other slave-traders sympathize with Tippu Tip. It is, on the contrary, quite conceivable that they may have been too strong for him, and that their influence, added to the promptings of an obvious self-interest, may have led him to reconsider his change of heart. In this case the odds would be tremendous against the explorer, who had plunged into the wilderness, relying on the good faith and the sense of honor of a man who had grown rich and powerful by hunting slaves. The danger from the Arabs is beyond question. They are resolute and intelligent, and they know that European supremacy means the speedy suppression of the slave-trade, and a check to Mohammedanism.

It is assumed by some that there is little to be feared from the negroes. Prof. Drummond says, in his *Trop-*

ical Africa, that he one day went so far as to ask his carriers why they did not kill him, a single man among so many. The answer was, that the white men were spirits, and that no negro would venture to kill a spirit. The annals of African discovery present an instructive commentary on this text, and afford little comfort to those who would like to believe that the native Africans, if unprovoked, may always be trusted.

Provocation, however, there is sure to be, if not for one cause, then for another. Dr. Junker, Emin Pasha's companion, speaking before the Swedish Geographical Society a few weeks ago, expressed a firm belief in the safety of the Expedition, and accounted for the non-receipt of intelligence by saying that Stanley would have to obtain food for his men by force, and would consequently be unable to send messengers through the tribe thus roused to hostility. If this explains the lack of news, it does nothing to lessen anxiety; and the report, unhappily confirmed, of Major Barttelot's murder reads like the first act of a dismal tragedy.

THE AFRICAN SLAVE-TRADE.—Cardinal Lavigerie will not be left to draw upon ancient history for facts concerning the horrors of the slave-trade in Africa. This traffic is actively pursued from the sources of the Niger to those of the Nile and from the Sahara to the Zambesi. *Le Mouvement Géographique* of August 26th devotes an extra sheet, with a map, to a rapid survey of the testimony borne by travellers in recent years. Nachtigal, in his last journey, was present at one of the slave-hunts of the Sultan of Baghirmi.

The men of the village attacked fought from behind

ramparts. Most of them were killed ; the rest and the women and children were carried off. Provisions gave out, dysentery declared itself, and the weaker slaves died one after another.

Flegel visited eight or nine years ago the Yaouri country on the middle Niger. It had been devastated a few years before by the Nakwamatch chief, who had destroyed fourteen towns.

Rohlfs, when at Kouka, the capital of Bornu, saw one caravan of 4,000 slaves set out, in detachments, for the northern markets ; and Nachtigal saw the shops of the dealers in the same place crowded with their merchandise. Baghirmi and Bornu make an industry of supplying the slaves destined to serve as guards of the harems in the Mahommedan countries. Rohlfs travelled the slave route across the Sahara. "On both sides of the road," he says, "were the whitened bones of the slaves, some of the skeletons still wearing scraps of clothing. A man who knew nothing of the way to Bornu would only have to guide himself by the bones on the right and on the left, and he could not go wrong." These slave routes lead to Morocco, to the country south of Algeria, the Fezzan, where, fifteen years ago, the annual importation reached 10,000, and to Siout, on the Nile.

In the Eastern Soudan the trade is not less active, the slaves being partly introduced into Egypt, but exported, for the most part, across the Red Sea. Sir Samuel Baker estimated the yearly exportation at 20,000, a figure which Schweinfurth holds to be much too low. Lieut. Wissmann tells in the *Proceedings* of the Royal Geographical Society for August, that he visited a Cen-

tral African town (Bagna Pesihi, of the Basonge tribe), clean, neatly kept, with grass-huts 20 feet high, and about 20 feet square. This town stretched in an unbroken line for about ten miles. The country was well cultivated, and the people were intelligent and kindly. Four years after, he visited the same place in company with Lieut. Le Marinel and Mr. Buslag. As they approached, the travellers were struck by the dead silence. The place was overgrown with tall grass, with here and there a charred pole and a few banana trees, the only evidences that man once dwelt there. "Bleached skulls by the road-side, and the skeletons of human hands attached to poles tell the story of what has happened here since our last visit." This was the work of the Arab slave-hunters.

Mr. James Stevenson, who has long been interested in the work of civilization in Central Africa, has recently brought out at Glasgow a pamphlet on "The Arabs in Central Africa and at Lake Nyassa," in which he proves, if proof were needed, that nearly every African traveller has the same story to tell of the Arabs, whom Mr. Blyden wishes us to admire as the redeemers of Africa. Mr. Stevenson quotes from Mr. F. M. Moir, (*Scottish Geographical Magazine*, 1885) a passage, here condensed. Kabunda (an Arab) had made a raid in the Garden of the Tanganyika and was going to Zanzibar with a caravan, 3,000 strong, carrying ivory and slaves. First came armed men, with drums and musical instruments; then the great man, with his head-men by his side, a courteous, white-robed Arab, with gold-embroidered tunic, silver sword and daggers, and silken turban, and behind him his wives and servants; after these the main body of

armed men, and mingled with them the slaves, tied two and two in the *goree* or taming stick, or in gangs of a dozen, each with an iron collar let into a long iron chain. The women were fastened to chains, or thick ropes, and very many carried, besides heavy loads of grain or ivory, their babies. To give way or to faint was to lose, not the ivory, but the child, which would be thrown aside to die. Hyenas followed the line.

Kabunda, Mr. Moir tells us, was a polished gentleman; and nearly all of the Arabs in Central Africa deserve to be classed with him. There is but one way to suppress the trade, which has been developed and is sustained by such men, and that is to cut off the access to the market. The combined action proposed by Cardinal Lavigerie would be efficient, if it could be begun; but the spirit of the Crusades is extinct, and the humanitarian spirit has not the energy to move nations. The work must be done by the roused political and commercial instincts of the Europeans, striving with each other for the prizes of empire in Africa.

Mr. Stevenson's pamphlet is illustrated with two excellent maps, compiled by Mr. E. G. Ravenstein; and a separate map, on a scale of 1:750,000, by the same competent geographer, gives, largely from unpublished materials, the whole country between Lake Tanganyika and Lake Nyassa.

THE MEAN ELEVATION OF AFRICA.—In *Petermanns Mittheilungen*, 34 Band, VII, there is a paper on this subject by Mr. Franz Heiderich. Mr. Heiderich's method was to divide the continent from N. to S. into zones of ten degrees of latitude, and the whole surface into

trapezes measuring ten degrees each way ; to calculate the mean for each trapeze, then the mean for each zone, and lastly that for the whole continent.

The final result was 673 metres — 2208 feet. He compares this with previous calculations : that of Chavanne, 661.8 metres = 2171 feet ; that of De Lapparent, 602 metres, corrected by Heiderich to 612 — 2008 feet ; and that of John Murray, whose average (maximum 616 metres, minimum 531 metres) is calculated by Heiderich at 573 metres — 1880 feet.

The surface of Africa rises, according to Mr. Heiderich's figures for the zones, almost regularly from the North to the South. The elevations are :

N. Lat.	40°—30°	1919 feet.
"	30°—20°	1273 "
"	20°—10°	1611 "
"	10°— 0°	1106 "
S. Lat.	0°—10°	2720 "
"	10°—20°	3307 "
"	20°—30°	3327 "
"	30°—40°	3904 "

PORTUGUESE EXPLORATION IN CENTRAL AFRICA.—A letter from Mr. Luciano Cordeiro, Secretary of the Lisbon Geographical Society, announces the return to Lisbon of Maj. Carvalho, Capt. Almeida and S. Marques, leaders of the expedition sent in 1884 to the State of the Muata Yamvo, E. of Loanda. The party met with many difficulties, due to the disturbed state of the country and the rivalries among the small rulers, as well as to disease and the failure of supplies. The collections made were considerable, and the latitude and longitude

and the elevation of fifteen places were ascertained. The region explored covered two degrees of latitude and seven of longitude, and the elevations reported range between 2300 and 3800 feet.

Eclectic Physical Geography by Russell Hinman. Van Antwerp, Bragg & Co. Cincinnati, New York (copyright, 1888).

After a short introduction on some general laws of Nature, Mr. Hinman divides his work into six parts : on the Earth as a Planet, on the Atmosphere, on the Sea, on the Land, on Weather and Climate, and on Life.

Each of these subjects is treated in detail and yet with conciseness.

The definitions and explanations given are nearly all intelligible in themselves, and are made still clearer by the diagrams and the maps, which bear out the claim made for them that they illustrate the text. The representations of animal forms are not always successful.

As an accomplished geographer, Mr. Hinman is familiar with the recent theories, and he seems, in some instances, to accept as established what are still subjects of discussion ; and he is less clear than he might be in some of his definitions.

In the chapter on Man he says, for instance (p. 363) that the Indo-Germanic branch is divided into "Aryans, or ancestors of the Hindoos and Persians ; Græco-Romans, or ancestors of the Greeks, Albanians, Italians, ancient Gauls, Irishmen and Welsh ; the Slavonians, or ancestors of the Russians, Bulgarians and Baltic tribes ; and the ancient Germans, or ancestors of the modern

Germans, Dutch, Scandinavians, Anglo-Saxons, or Englishmen, and of a vast majority of the present inhabitants of the United States."

The word *Aryan* is sometimes, though not always, used in the restricted sense here attached to it, and may stand; but there is in the passage a confusion of ancient and modern names and ideas. Italians, Irishmen, Russians, Bulgarians and Hindoos are all modern, but they are classed with Persians and Baltic tribes. Where are the Baltic tribes and the ancient Gauls? The intention is, no doubt, to give a mere outline, but there is little symmetry in the outline that touches the Albanians and the Welsh and the Dutch, and passes by the French and Spaniards and Portuguese.

With so much that is excellent in the book, it would gain, rather than lose, by the suppression of the Scripture quotations, which give to the chapters the appearance, without the authority, of exhortations from the pulpit.

Le Grandi Strade del Commercio Internazionale proposte fino dal Sec. XVI. per Gustavo Coen, Livorno, 1888. (From the Author.)

Mr. Coen's work, which is dedicated to the Italian Geographical Society, keeps to its subject and gives in its 500 pages an interesting account of what is on record concerning the routes of communication between the Eastern and the Western worlds from the Middle Ages to the present time. Three principal routes were followed at the beginning of the Middle Ages: that by the Caspian and the Volga; that by the Red Sea and Cairo, or Alexandria, to the Mediterranean; and the

route by the Persian Gulf to Damascus, or Aleppo. All these lines were for a long time in the hands, chiefly, of the Arabs, with whom relations were established by the Venetians, Pisans, Genoese, and Catalans. It is a familiar story how the supremacy of the great Mediterranean cities was overthrown by the doubling of the Cape of Good Hope and the establishment of the Portuguese dominion in the East. Priuli, the Venetian diarist, quoted by Mr. Coen, writes in February, 1504: "The galleys from Alexandria have come in empty, a thing never seen before." There is a similar entry in March for the ships from Beyrout; and in August of the same year it is recorded that the King of Portugal had invited the Venetians to visit Lisbon in order to purchase their supplies, but, adds Priuli, "the sagacious Fathers propose to give mature consideration to this matter, which is of such great importance."

Sagacious the Fathers certainly were, for the documents exist which show that the Council of Ten, the same year, instructed Francesco Teldi, their special Envoy, to lay before the Soldan of Egypt a plan for cutting a canal from the "Red Sea straight through to this Sea" (the Mediterranean).

The passage in the instructions was afterwards cancelled, but the stroke of the pen drawn through the words was so slight that they are still distinctly legible.

The Turkish Sultans cherished the idea of the Canal and the Venetian ambassador Bernardo wrote from Constantinople in 1586 that, "Amurath (III) wishes to have the ancient channel that passes from sea to sea excavated, and that he (the Bey of Yemen) shall gather information from those acquainted with the country, and

shall take for the work three men from each village and relieve them of every other burden."

This was fifteen years after the battle of Lepanto had broken the Turkish naval power in the Mediterranean. The Portuguese (then subjects of Philip II.) were supreme in the Indian Ocean, and it is not surprising that the Turks gave up the idea of the canal.

The route by way of the Caspian and through Russia, if it never seriously competed with those to the south, always remained open, and seems now likely to become a great commercial road. This is, at least, Gen. Annenkoff's opinion, but Mr. Coen does not agree with him.

An especial interest attaches to the plans for cutting through the American isthmus.

The voyage of Columbus to the West in order to reach the East, the long-continued search for the secret of "The Strait," the repeated efforts to discover a North-west passage, all had their origin in the idea that it was illogical to accept the belief in a permanent barrier between the oceans.

Mr. Coen summarises the history of the various propositions for opening a water-way through the Isthmus and dismisses somewhat briefly the other routes to consider, at some length, the various phases through which the Panama Canal has passed. He states fairly some of the objections that have been made against the route by Panama, but he considers that the difficulties in the way are political rather than technical or economical. It will appear to some that he is disposed to accept too readily the statements made in the Company's *Bulletin*, and that he passes over real obstacles

with a light-heartedness worthy of M. de Lesseps. To use his own words, however, the decision in these matters must be left to time.

The Last Journals of Bishop Hannington, being Narratives of a Journey through Palestine in 1884 and a Journey through Masai-Land and U-Soga in 1885. Edited by E.C. Dawson, M. A. Oxon.

London, 1888.

Slight as are these Journals, which divide the little volume almost equally between them, they have the charm of naturalness in language and of the manly spirit which characterised Bishop Hannington.

In the Holy Land he sees what is before him, the dirt, the ruin, the desolation, the sordid and evil ways, through all the glamour of association ; and he picks out a type. On the road from Damascus to the Druse country he met two Bedouin sheikhs, one very wicked-looking, the other mild and benevolent—a remarkably handsome man, who would have made a splendid model for an Abraham or a Jacob. When the talk turned on war, the mild man bared his body, which bore an amazing number of scars, and told with flashing eyes how the one and the other had been received, until, wrought up to fury, he took his sling and showed what he could do with a Philistine by striking a rock at a hundred yards distant with a force that shattered the stone sent.

This was, however, but mimic war. In Africa the Bishop was almost constantly in real danger, and he bore himself like a man.

Collisions between his men and the natives were frequent, and there was bitter quarrelling in his camp.

He was often compelled to make the unruly "eat stick," and to risk his life in an effort to stop a fight. Food was sometimes scarce and the Bishop turned sportsman to provide it. He took kindly to the work, more kindly, indeed, to judge from the entries in the diary, than was quite necessary.

It is not yet two years since he fell, miserably betrayed and murdered by the people he would have helped.

TITLES OF PAPERS IN GEOGRAPHICAL JOURNALS.

AMSTERDAM.—*Tijdschrift van het Neder. Aardrijkskundig Genootschap.*

The Judgment of God and Oaths—Timor and its People—Contribution to the Knowledge of the Soil of Friesland—Journeys in the Basin of the Lower Ketaun (E. Sumatra) and a Four Days' Excursion in Lebong—The West Coast of Atjeh (Acheen)—The Engano Group.

BERLIN.—*Gesellschaft für Erdkunde, Verhandlungen.*

Results of an Exploring Expedition in the Sinaïtic Peninsula and in the Arabian Desert (Dr. Joh. Walther)—Von Krasnoff's Travels in the Thian-Shan.

Deutsche Kolonialzeitung.

The British East-African Association—A Proposal with Regard to the Emigration Question—Our Over-Production of Skilled Labor and Practical Colonization—Some German Colonies in Russia—The Problem of the Colonial Movement—The Position of a Great Power and that of a World-Power—Stanley and

Emin Pasha—Commerce and Navigation on the Niger and the Benue—An Economical Crisis in Southern Brazil—Conditions of Labor in Usambara—Organization of the German Colonial Association—A Ride through the Coast Region of S. W. Africa—The East African Mission—History of the South African Republic (Karl Blind)—The Situation in the Pacific—Lord Aberdare on the Rights of the Royal Niger Company—Protection of German Interests Beyond Sea by the Navy—Administration of the East African Coast by the German East African Association—Cardinal Lavignier and the Arab Question.

BREMEN.—*Deutsche Geographische Blätter.*

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BRUSSELS.—*Bulletin de la Société Royale Belge.*

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CAIRO.—*Bulletin de la Société Khédiviale de Géographie.*

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Effects of Wind on the Distribution of Temperature in the Sea and Fresh-Water Lochs of Scotland (Dr. John Murray)—Utilisation of Waste Lands—Attempts to Reach the Owen Stanley Peak—Recent Explorations in the Territories of the African Lakes Company—(E. G. Ravenstein)—Notes on the Dutch East Indies, 1888—On the Travels of Ibn-Batutah (Prof. Paul Chaix)—The Western Sahara, between the Tropic of Cancer and the Wadi Draa.

FLORENCE.—*Bullettino della Sezione Fiorentina della Società Africana d'Italia.*

What We Have Done and What Remains to be done in Africa—Zanzibar.

GOTHA.—*Petermanns Mittheilungen.*

A Century of African Exploration (by Dr. A. Supan)—Exploration of the Sankuru—The Caves of the United States—The Mean Elevation of Africa—The Fate of Lupton, Slatin and Other Captives of the Mahdi—Geological Development of South Africa—The Togo Coast and the Eve Region (in Guinea)—Changes Effected by Man in the Flora of California.

LISBON.—*Boletim da Sociedade de Geographia.*

First Explorations in the South of Angola—Colonization of Timor—Portuguese Guinea, and Its Present Condition.

LONDON.—*Proceedings of the Royal Geographical Society.*

Suanetia (Caucasus)—Exploration of the Solomon Islands—Exploration of Route between Assam and Upper Burma—Annual Address on the Progress of Geography: 1887–8 (Gen. R. Strachey, R. E., etc.)—Fernando do Noronha in 1887—Journey up the Cross River, West Africa (H. H. Johnston)—The Kaap Gold-Fields of the Transvaal—Journey Across Central Asia from Manchuria and Peking to Kashmir, over the Mustagh Pass—Unexplored Basuto Land—The Influence of Arab Traders in West Central Africa.

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The Incurvature of the Winds in Tropical Cyclones—Life-Statistics of an Indian Province (the North-West Provinces and Oudh)—Earthquakes and How To Measure Them—The White Race of Palestine (A. H. Sayce)—The New Vegetation of Krakatão—The Non-Chinese Races of China—The Scientific Value of Volapük (Report by Committee of the American Philosophical Society)—Storm Warnings.

MADRID.—*Boletín de la Sociedad Geográfica.*

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NAPLES.—*Bollettino della Società Africana d' Italia.*

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NEW YORK.—*Science.*

The Great March Blizzard—The Rainfall at Fort Leavenworth—The Hemenway-Cushing Expedition—The United States Geological Survey's Topographic Maps—The Census Maps of the United States (Dr. F. Boas)—The Pilot Chart of the North Atlantic—The Philippine Islands (letter from Manila)—Prevention of Floods in the Lower Mississippi—The International Geological Congress and Our Part in it as American Geologists (Prof. Geo. H. Cook)—Evidences of the Antiquity of Man in Eastern North America—Recent Developments in Great-Circle Sailing.

PARIS.—*Compte Rendu de la Société de Géographie.*

Notes on Tashkent—Some Remarks on the Chinese Calendar with Regard to the Unification of Time—Journey across South America by M. Monnier—Russian Scientific Societies (by M. Venukoff)—Reform of the Calendar—The Upper Mekong—The German People, Its Strength and Its Resources—M. Thouar on the Pilcomayo and in the Northern Chaco—Geology of Lake Kelbia and the Sea-Coast of Central Tunisia—The Lakes in the Island of St. Michael (Azores)—Moheli (Comoro Islands).

Bulletin.

M. Maunoir's Report on the Progress of Geography in 1887—Celebration (20 April, 1888) of the Centenary of La Pérouse's Death (a thick pamphlet containing portraits, illustrations, and maps, besides a Bibliography, by M. Gabriel Marcel, of works relating to La Pérouse).

Bulletin de la Société de Géographie Commerciale.

The French Policy in the Leeward Islands (Pacific Ocean)—The Deep Sea Fisheries of France—Roads and Ways in Cochin China—The New Hebrides—Navigability of the Red River (Tonkin)—Sous and Sfax (Tunisia)—Diégo-Suarez and Its Commerce—The Algerian Empire—The Peruvian Cordilleras—Mexico—From the Oxus to Samarkand—The North-eastern Coast of Tonkin.—The Faï-Tsi-Long Archipelago—In Darien—The Franco-Spanish Difficulty in the Gulf of Guinea.

ROME.—*Bollettino della Società Geografica Italiana.*

The Fourth Centenary of the Discovery of America—On the Name *America* (Appendix to a Second Memoir by Prof. Luigi Hugues)—Columbus and Savona—Climate of Let-Marefià in Shoa—Against Emigration to the Upper Orinoco—Cruise of the *Corsaro* to the Azores—Teaching of Geography in Secondary Schools—From Moulmein to Mt. Mulai (by Leonardo Fea).

TURIN. *Cosmos.*

Solution of the Sanpo³ Problem (Brahmaputra)—From Assab Bay to Shoa—Nachtigal's Journeys in⁷ the Sahara and the Sudan, 1869–1874—The Mayas: an Ethnological and Linguistic Essay.

VIENNA.—*Mittheilungen der K. K. Geographischen Gesellschaft.*

My Travels in Eastern Equatorial Africa (Dr. W. Junker)—Something about German East Africa—A Short Visit to the Nicobar Islands—Annual Report of the President.

WASHINGTON LETTER.

WASHINGTON, SEPT. 15, 1888.

A survey of the frontier line between Alaska and British Columbia is to be instituted. Preliminary thereto it is proposed to ascertain the latitude and longitude of certain points that are accessible by the water-ways, so that those points and the 41st meridian may be established, thereby enabling any future commission which may undertake to settle the true boundary to have some definite localities which are accessible, for laying down the line—the points to be ascertained astronomically. It is stated that the treaty ceding the Alaska Territory to the United States was based upon a theoretical map, and was not in accordance with the actual geography of the locality, and that there is no possibility of fixing the points according to the description in the treaty. This is a reminder of the Louisiana purchase.

The late European Geodetic Association having expanded and assumed a new title, THE INTERNATIONAL GEODETIC ASSOCIATION, the German Government has invited the co-operation of those countries which have not already taken part in the organization. At the request of the German legation at Washington, the Secretary of State and the Superintendent of the Coast Survey have induced Congress to appropriate an amount sufficient to pay the contribution required of the United

States, including the expense of the attendance of the American delegate. As remarked by Prof. B. A. Gould in advocating the measure: "The essential question is that of fraternal action on the part of the United States by associating itself with other nations in an organization of which the sole aim is, through joint, harmonious action, to advance and systematize our knowledge of the form and surface of the earth which we jointly inhabit."

H.



By an error of the printer, the pagination of the present number is wrong from page 500.





THE GREAT WALL OF CHINA.

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CHINA AND ITS PROGRESS.

BY

MAJ. GEN. JAMES HARRISON WILSON.

WHEN it is remembered that the area of the Chinese Empire is not far from 5,000,000 square miles, or about one-tenth of the habitable globe, and that its population, although not definitely known, is probably somewhere between 300,000,000 and 500,000,000, or from a fifth to a third of all the people in the world, an idea, although a vague one, may be had of the magnitude if not of the importance of the subject chosen for the lecture of the evening. If you will recall the further fact that that vast region is now and always has been separated from the rest of the world by an almost illimitable waste of waters on one side, and by an almost impassable waste of sand, and desolate mountains and plains on the other, you will understand why China and its civilization are peculiar. Occupying eastern and southeastern Asia, China is as far away from the centres of the world's civilization as it

is possible to be. Its isolation is as yet absolute on the land side. No great commercial movement is possible across the steppes of Central Asia or the sands of Gobi until railroads are built, and even then the movement of Commerce, in order to become the efficient handmaid of modern civilization and modern progress, must necessarily be preceded or accompanied by a military movement, if not one of absolute conquest.

The significance of China's isolation will be more fully understood from a recital of the fact that the desert-belt separating it from Europe and northern and western Asia varies in width from one hundred to six hundred miles, and extends nearly ten thousand miles in unbroken solitude from the great bend of the Amur River entirely across Asia and Northern Africa to the Atlantic Ocean. Its general direction is west-southwest. The Nile flowing northward, and the Euphrates flowing southward, break through it, but the nations on the opposite sides of this belt have remained throughout all time essentially different from each other in race and civilization. It is true that the border regions of China have been the nursing ground of conquering tribes, but so far as history records they have not materially influenced the civilization of China and still less that of Europe. It is from this region that Genghiz and Tamerlane, driven by hunger and want, sallied forth to conquer the world. Although the story of their achievements on the borders of Europe constitutes one of the most interesting chapters of human history, we must pass it by, and turn for a moment towards China, where they were far more successful. They met here a weaker and less warlike resistance, and having relatively but a short distance to

march, they made an easy conquest. In less than one generation they overran the whole empire, and Kublai Khan, the grandson of Genghiz, became perhaps the greatest Emperor China ever had. It was during his reign that the Polos, Nicolo, Maffeo and afterwards Marco, the adventurous Venetian merchants, crossed the Black Sea, through Russia to Bokhara and thence over the Plateau of Pamir, and penetrated China from the west. The same general route was pursued by Ibn Batuta, an Arabian traveller, a few years later, and by the Jesuits in considerable numbers still later, and they doubtless exerted a marked influence on the individuals with whom they came in contact. It may also be true that, from the earliest dawn of civilization, an occasional Russian, Egyptian, Greek or Roman, more venturous than the rest of his race, made his way into China, though it is absolutely certain that they failed to make the slightest impression on Chinese civilization. That civilization is and always has been Asiatic. It is entirely different from that of Europe, and could hardly have been more different if it had had its origin in another sphere. The Hindoos gave it the dead cult of Buddhism, and that is about all China ever got from the world beyond.

It is scarcely necessary to call attention to the fact that the sea, from the beginning of time down to the end of the Middle Ages, formed an absolutely impassable barrier between China and the rest of the world. The introduction of large sailing ships enabled Rafael Perestrello, a Portuguese mariner, to reach the southern coast in 1516, and as the ships grew larger and the spirit of commercial adventure became bolder, communication became

more certain ; but it was not till steamships were introduced that Europeans and Americans were brought into regular and frequent contact with the Chinese. This of course does not date further back than forty years, and for all practical purposes may be considered to date from 1861 only. But so rapid has been its development that at this time Hong Kong and Shanghai are reached by the steamship lines of every nation, and it is no exaggeration to say that they are among the most important seaports of the world. They are now on the highways of commerce, and are visited annually by travellers from all quarters of the earth. Hence they are centres of thought as well as of trade, and must play an important part in the progress of China.

It is not to be supposed that the members of this society require any explanation of the geography of China, but your guests will doubtless pardon me if I call attention to the fact that China proper contains 19 provinces, corresponding to our States, and covering an area about equal to that of the States east of the Missouri river, including Texas, Kansas and Arkansas, or say 1,800,000 square miles. Their governments are modeled on that of the empire. The governors are appointed by the throne, and hold office for three years, though this rule is frequently broken over for reasons of state.

The governor general of the metropolitan province Chihli, Li Hung-chang was appointed to that office in 1870 and has held it continually, except for a few months following the death of his mother. He is a pure Chinaman, a great scholar, a fellow of the Han-lin college, a successful general, a distinguished diplomat, the tutor of

the young Emperor, First Grand Secretary of the Empire, Head of the Admiralty, and chief adviser in military matters. In short he is the greatest and most progressive statesman of China, and plays a leading part, so far as any Chinese subject can, in all that concerns either its internal or external business. He does not, however, nominally hold any office in connection with foreign affairs, and yet no treaty or business connected with that department of the government is ever disposed of without consulting him. Having been thrown constantly in contact with foreigners during the Taiping Rebellion, and since that time, he has learned their ways, and knows how to deal with them, and in emergencies how to avail himself of their assistance. He is a crafty, kindly, liberal man, far in advance of the class to which he belongs. He is fully aware of his country's needs, and of the desperate straits into which its affairs are drifting, and under any other form of government, surrounded by any other condition of affairs, would long since have become its guiding power, if not its chief ruler. But he is a subject, and no one unacquainted with the principles and practice of Oriental Governments can understand just what that implies. I shall endeavor further on to give you some idea of it. Suffice it to say now that it is more powerful to restrain the strong than the weak, and holds even the great Viceroy strictly within the defined limits of his own official functions. All powerful as he is within his own sphere, the throne is so far above him, in whatever it chooses to reserve to itself, that the thought never enters his head to set up his own wishes or opinion against it. It is the centre of all authority, all law, all mercy, and in the Chinese system of government

stands immeasurably above all earthly powers and principalities.

But to return for a moment to the provincial governments. One other thing is worthy of note in connection with them. No man may be a governor general in his native province, nor in that of his wife, nor may his brother or any other close relation hold office in the same province with him. He is, however, in many respects, an absolute ruler, and has much to compensate him for his isolation.

The rivers of China generally flow eastward into the Pacific Ocean ; hence their deltas and valleys are open to the eastward, instead of to the southward, as ours are. The Amur, which used to be a Chinese river, but now is in the middle land occupied by Russia, between China and Siberia, the Hwangho, and the Yangtse-kiang, are the principal streams of the Empire, and give drainage and character to its surface. The great plains, comprising the delta of the Hwangho and the Yangtse-kiang, are about 700 miles long, by from 300 to 500 miles wide, and are as level throughout their extent as running water. They have a sea-coast line of about 1100 miles, and contain a population estimated at 125,000,000 souls. The chief cities in the Great Plain are Peking, Tientsin, Pautingfu, Chinanfu, Kaifongfu, Chinkiang, Sutchow and Hankow. Nanking, the old capital of the Chinese dynasties, is situated on a plain surrounded by hills, but near the edge of the delta and about six miles back from the great river. It was the capital of the Taiping government, under whose direction a great part of it was destroyed. It has, therefore, lost its ascendancy as a metropolitan city. But so advantageously is it sit-

uated, that whenever China throws off the domination of the present dynasty, and again calls a native one to the throne, Nanking must once more become the seat of government.

All first-class cities are surrounded by high brick walls, crowned with crenelated parapets, furnished with buttresses, wet ditches, and iron-bound gates, which are closed regularly at sundown, and opened at sunrise, just as was the custom in Europe during the Middle Ages. The smaller cities are surrounded by mud walls or embankments, but all of them have brick walls at the gates. So much is this arrangement a necessary part of the national system, that if a new capital should be established anywhere, even for temporary purposes, as in Formosa a few years ago, no matter how poor the province might be, it would be deemed absolutely necessary to surround the government buildings and offices by a stone or brick wall thirty or forty feet high, and to furnish it with all the appliances of the Middle Ages. The one at Tai-pakfu in Formosa had been built only a short time when I visited the Governor-General of that Island. It was located in the middle of what had been a series of rice fields, and enclosed a square mile of land.

The walls of Peking, twenty-four miles around and about forty feet high, are a fair type of the city walls found everywhere, and also of the great wall wherever it is penetrated by the old highways, connecting the seat of government with the outlying dependencies. And here it may be worthy of remark that these city walls constitute by far the largest and most impressive works of the Chinese race, unless I except the great river embankments and the grand canal.

Here it may also be well to remark, that the grand canal generally occupies a series of river and creek beds, and is therefore quite crooked. Its embankments are also crooked, poorly constructed and sadly neglected, and the same may be said of the embankments of the great rivers. The canal has no locks, but is divided into reaches of greater or less extent by masonry sluices, which are wasteful of the water and render navigation difficult. As the canal runs through a region in which rain rarely ever falls except during the wet season of June, July and August, it is either running over with water, or has next to none at all, and in either case navigation is frequently suspended or materially interfered with. The construction of the canal was a great work for the age in which it was undertaken, but, like all the great works of China, it is far behind modern works of the same kind in other countries. Hundreds of thousands of dollars, every year, and not unfrequently millions, are spent to clean out the canal and restore navigation through it, but all the money which is not stolen is wasted. There is good reason for the opinion that the average sums thus disposed of would in three years build all the locks, feeder canals and other auxiliary works required to put the canal in good condition, and to keep it open for navigation at all seasons of the year except when frozen, and that ten years' capitalization of it, would build and equip a first-class double track railroad from Peking to the Yangtse-Kiang, a distance of 750 miles. So far as history shows, this wasteful system has never been interfered with or intermitted for eight hundred years. It affords rich pickings for the officials having charge of it and while many of them have been caught and banished

to Ili, or some other out-of-the-way province, for speculation, it is sure that this has been due to the fact that they were in most cases greedy and did not understand "addition, division and silence," rather than to any genuine disapproval of their rascality.

The Chinese people belong to the great Turanian or yellow race. They are remarkably homogeneous, and free from foreign intermixture. So far as I could judge from extensive travels in the interior, they are strong, healthy, robust and well behaved. They are frugal, industrious and kindly in their disposition, but neither warlike nor aggressive in temper, and can never have been a conquering or migratory people. Their isolation has protected them in the past, but they are now so numerous and so vital that any race brought in close contact with them must either dominate them or become swallowed up like drops of rain by the sea. They seem to be naturally conservative and slow to change their manners and customs, at least while living at home, where, it must not be forgotten, they are surrounded by a set of fixed and unvarying conditions, which hold them in their grasp and nullify all natural tendencies not in harmony with old custom or the traditions of their race.

They are democratic to a high degree, and all their institutions are calculated to foster democratic ideas and customs. They have no hereditary nobility except that of the Imperial Clan. Every man is naturally as good as his neighbor, and in fact, as well as in theory, every man has just as good a chance as his neighbor to become honored and respected by society. The only aristocracy is that of letters, and the only road to honor and fame and public office is through the public examina-

tions, which are open to all who choose to prepare and present themselves for the ordeal.

The most curious and interesting fact connected with China is that its government is the government of a conquering race. The present dynasty was founded by a petty Manchu Tartar chieftain, Aisin Gioro, and his grandson Nurhachu, who subjugated the neighboring tribes, overran the province of Shinking, and carried on war successfully for many years against the waning strength of the Ming dynasty. The latter was a Chinese dynasty founded by a great soldier, and in turn succeeded the Mongol Tartar dynasty of Kublai Khan, each of which ruled the country for something over two centuries. The most singular circumstance connected with the Tartar dynasties is that there never could have been at any time over two million Mongol or Manchu Tartars, and so far as history affords any evidence, the conquering army which placed the present dynasty on the throne could never have exceeded 250,000 men, and most probably not a third of that number. What the population of China was at that time cannot be determined, but it could not have been less than 100,000,000, and might have been as much as 200,000,000. It follows, of course, that such a conquest could not have been made unless the Chinese were divided and betrayed, or unless they were entirely devoid of military aptitude and military training. It is known that the Ming dynasty was effete, and it is certain that intrigue and treachery were important factors in shaping the course of events at that time.

The history of the Chinese government, and of the dynasties which have controlled it, is for the most part the history of intrigue, violence and anarchy, with only

here and there a great ruler to stay the hand of plunder and save the country from absolute ruin. Here, as in other Oriental countries, each dynasty begins with a vigorous and virtuous man, whose son or grandson may also have been virtuous and vigorous, but, whether native or foreign, the dynasty soon becomes corrupt and incapable. No matter what its origin, it adopts Chinese methods and civilization, and becomes Chinese in the end. The system which has come down from the remotest ages ultimately saps its vitality, and in the presence of the slightest emergency the sceptre falls from the nerveless grasp of the imperial puppet who holds it and for a while anarchy and confusion prevail.

The form of the government is an absolute monarchy of the patriarchal type. The Emperor is its sole responsible head. He has no regular ministry, but is assisted in carrying on the Government by a secretariat, and six great boards, whose duty it is to prepare business for his action ; and also by several courts, the greatest of which is the Censorate, or "all-controlling court." The Government being, as before stated, a government of conquest, every board and court is furnished with a Tartar president and a Chinese president, a Tartar vice-president, and a Chinese vice-president, a Tartar secretary and a Chinese secretary, and this division is carried into the membership, and as far as possible in the selection of the underlings, clerks and attendants. The Board of Censors is by far the most important body in the State. It stands next to the Throne, supervises and distributes all public business, and may petition the Emperor at all times and upon all occasions. Its operations are all-pervading and ever-

present. Wherever two or three Chinamen are gathered together, one of them is sure to be an agent of the Censorate, and this makes every Chinaman suspicious of every other Chinaman. The army is mostly under command of Manchus belonging to the Imperial Clan, and by these two powerful agencies the country is held in subjection.

The present Emperor was born in 1871, and is therefore only seventeen years old, according to our method of reckoning age; but as all Chinamen are regarded as a year old the first New Year after birth, he is now eighteen according to their count. He is not the son, but the first cousin of the last Emperor, who died without issue, and this is the first time the direct male line has failed in the history of the present dynasty. His father is known as the Seventh Prince—that is to say, he is the seventh son of the late Emperor Tau Quang, and the sixth brother of the Emperor Hienfung, who died young, leaving an infant son, and he in turn died almost immediately after reaching his legal majority. The present Emperor was chosen by family council—really by the two principal wives of the Emperor Hienfung, who were also sisters, and who as co-regents and empresses dowager, have had absolute control of the Empire since 1861. Several years ago the elder wife died, leaving the entire control in the hands of her sister, the present Empress-dowager. The latter has governed with great vigor and independence, and is still the most influential personage in the Empire, though, according to Chinese custom and law, both she and the Emperor's father will have to retire to private life when the Emperor assumes personal control of the Government.

The Emperor, being the Son of Heaven and ruler over all earthly things, is furnished with a family modeled after Solomon's, and it is served by an unfortunate class common to all governments of Continental Asia. The court of China, which consists of the Imperial Clan or kinsmen of the Emperor, is shut up within the Imperial or the Carnation, Forbidden City at Peking, and holds no intercourse whatever with foreigners. It has no more to do with foreign diplomats than it would if these diplomats were still living in their own countries, and far less than did the Court of Kublai Khan in the days of Marco Polo. The Censors and great dignitaries of the Empire, and indeed the whole governing class, with the exception of a few such men as Li Hung-Chang, the Tsengs, and Liu Ming-Chuan, Governor-General of Formosa, also hold themselves entirely aloof from foreigners, and as far as possible from foreign ideas. No foreigner has ever seen the Empress-dowager or the young Emperor, except possibly by stealth. No diplomat has ever talked with either of them, and it is not known that any of their own attendants are in any way familiar with western knowledge or the natural sciences, or have any just conception of western civilization and progress. When it is remembered that even the greatest men in the Empire are prohibited from approaching the throne, whether occupied or empty, unless commanded to do so, and then only with their bodies prostrate in the dust, and that the imperial personages hold absolutely no intercourse with ordinary mortals, some idea will be had of the complete isolation and ignorance in which they live. They may be profoundly learned in the philosophy of Confucius, the "Ever-prescient sage," and in the history and

jurisprudence of China, but these pertain to the dead past, and take no cognizance whatever of the affairs of to-day. The court sets the fashion in China as well as elsewhere for the governing class, and as the latter is small (it is said there are only 30,000 office holders in China, over 20,000 of which are Manchus), exclusive and conservative, it cannot be expected to move except as the court moves. It adopts no new ideas, and runs counter to no prejudices of the people or court, and as the people themselves have nothing whatever to say in regard to Government affairs, and indeed nothing to do with them but to pay their taxes, practice "fung shuey," submit to exactions and keep silent, they exert no pressure and have no direct influence upon the Government. No such thing as popular education exists; the people have no common dialect; every province speaks its own tongue, and they are all different from the court or literary language of the country, which is understood by only a few; hence ideas, no matter how important, make their way but slowly, and never from the people upward to the throne.

And yet China as a country has made substantial progress since the beginning of the present century, and especially since the English and French invasion in 1861, and the termination of the Taiping Rebellion in 1863. The influences which have brought about that progress, were first, commerce; second, war and diplomacy; and third, the missionaries. Although the first has been most actively at work, it touches only the maritime cities and provinces, and even these in a modified way. No foreigner ever buys or sells in China. All such work is done by Chinese compradores, while the foreign mer-

chants sit in their counting houses and play the grandee. In the earlier days of commercial intercourse, the Chinese Government undertook to manage trade, and to conduct through superintendents and commissioners all business transactions. It also insisted upon the foreigners doing the same, and set aside places at each of the important ports for their residence. So long, however, as the East India Company had a virtual monopoly of the China trade, as it did up to 1834, the individual merchant, no matter of what nationality, had but a poor chance. In the course of time that trade grew to be so important and profitable that neither the Chinese nor foreign Governments could supervise it closely. Both were, therefore, forced to leave it to the merchants themselves, and this necessarily led to trouble, which was followed by treaties and commercial regulations. The English insisted upon trading where they pleased and in what they pleased, and especially in opium. The Chinese resisted, and this led to wars, in which they were worsted. They were finally, after suffering great loss and humiliation, compelled to legalize the opium trade, and to submit to an *ad valorem* tariff of only five per cent. on all other goods imported from foreign countries. The English also made them pay heavy subsidies in money; and finally, in 1861, an allied army of English and French captured the Taku forts, and marched by Tientsin and Tung Chow to Peking. They drove back the Chinese army, commanded by the Tartar Prince Sankolinsin, drove out the Government, destroyed the summer palace, and exacted a subsidy sufficient to pay the entire expenses of the war. They demonstrated their irresistible power, and convinced the Chinese that it was utterly impossible

for them to stand up successfully against the "foreign devils," but withal they left the principal part of their work undone. They should have insisted upon haling the Imperial Government from its exclusiveness, and compelled it to live in open day, where it could always be got at and treated with upon the great questions of the age. The treaties made at that time required the Emperor to give audience to the foreign ministers, and the poor young fellow, after vainly insisting upon the kotow, did so, but he died of smallpox almost immediately afterwards, and the Government passed again with but a slight interregnum, under the control of his mother and aunt, who have, both collectively and separately, by one means or another, managed ever since to avoid any intercourse whatever with the foreign representatives. It is a fact as instructive as it is curious, that the credentials of all the ministers accredited to the Emperor since 1875 are still in the safes of the various legations. The Emperor has not received them, and evidently does not intend to do so, if he can avoid it. And, of course, he and his Manchu advisers must remain in ignorance of foreign civilization, and the great commercial movements which characterize it, till the barriers which hedge them about are thrown down. While it cannot be denied that foreign wars have opened the eyes of the Chinese to the fact that their Emperor is not Monarch of the World, as they have always made him believe, it is probable that they have studiously concealed the truth from him, and hence he must some day meet with a rude awakening. Just how and when that is to come affords ample ground for speculation, and one man's speculations are about as good as another's.

Before giving mine, I desire to call attention somewhat more fully to the Taiping Rebellion, which was started by a disappointed literary student, who failed to pass his examinations, and afterwards became a religious fanatic. His name was Hung Tse-Chuen, and his fundamental idea seems to have been, *China for the Chinese*, and the substitution of himself for the Manchu dynasty. His success was for awhile phenomenal. Having adopted a sort of Mormon Christianity, and called in an American missionary, the Rev. Issachar Roberts, as his spiritual adviser, the foreigners in China seemed at first to favor his cause. But in the end he became arrogant, and threatened their chief settlement at Shanghai. Concluding that no reliance could be placed on him, the foreigners determined to defend themselves. They organized a company, which they placed under the command of a Yankee sailor from Salem, Massachusetts, who had been first mate on an American ship, but was then out of employment. The foreigners resolved to throw the weight of their influence in favor of the Imperial Government, and this company became the nucleus of the "ever-victorious army," while Ward as its general displayed genius of the highest order in organizing it and leading it to victory. Operating under the general supervision of Li Hung-Chang (now the Great Viceroy), this force, made up of Chinamen but armed with foreign rifles, and commanded by foreign officers, decided the issue in favor of the Manchu dynasty, and overthrew the rebellion. After a remarkable career of two years, Ward was killed at the head of his command, and was succeeded by Burgevine, also an American, but the latter proving insubordinate, was removed, and Captain Gordon, of the

Royal British Engineers, afterwards known to fame as Chinese Gordon, the martyr of Khartoum, was appointed to succeed him. He was an able and gallant officer, and although commonly regarded as cranky, he had the good sense to adopt the methods of Ward, and to complete the work so ably begun by the latter, who is recognized by all who knew him, and especially by well-informed Englishmen, as a very able and very remarkable man. Gordon rendered the Imperial Chinese Government the highest and most valuable services, and was greatly regarded by Li Hung-Chang, the Imperial generalissimo. Without him and his ever-victorious force the Manchu dynasty would have been expelled, and the rebellion would have succeeded. His deeds, his methods and his courage became known throughout the Empire. They were talked about in every city, town and hamlet, and it may be safely said that they did more than all other influences combined to impress the thinking men of the Empire with a sense of their own helplessness and with the fact that the foreigners were superior to themselves in aptitude as well as in the appliances of war.

And so it may be truthfully said that the real awakening of China began at the close of the Allied invasion, and of the Taiping Rebellion. The great men of the Empire were at that time Li Hung-Chang, and the brothers Tseng Quo-Fan and Tseng Quo-Chuan. They were all pure Chinamen, and had learned enough to become liberals in thought and policy. The next great man of the Empire, and by many regarded as the greatest soldier if not the greatest statesman, was Tso Tsung-Tang, who afterwards led the remarkable expedition to Kuldjah. He was also a pure Chinaman, and a great scholar,

but he was a conservative of the conservatives, and would have nothing to do with foreigners except to use their cannon and small arms. He died in 1885, full of years and honors, one of the four Grand Secretaries of the Empire. Indeed he laid claim to priority over Li, but the Throne decided against him, and assigned him to the second place. It is customary in China to retain their great men in the service of the state till their eyes are closed in death, and it is also customary for those men, who in advanced age come to be looked upon as seers and sages, to write a dying memorial to the Throne. That of Tso Tsung-tang is one of the most pathetic messages of the kind known to literature. It begins as follows: "May it please your Majesties! Your Majesties' gracious favor unrequited. Your servant sick unto death utters these valedictory words and implôres that the sacred glance may deign to rest thereon!" He then alludes briefly to his bodily ailments, his last furlough, the surrender of his Imperial Commissioner's Seal, and the certainty of his approaching end. He recounts how their servant, "a poor scholar of books," attracted the imperial favor, how he became privy councillor and commander in chief of the army, and humbly adds that "were his corpse to be rolled into an ass's skin he could not claim that he had not received his due." After briefly alluding to the war with the French in Anam, to the aggression of Japan and to the various nations of the earth, "watching around his country like glaring beasts," he points out with the wisdom of a seer, that China will not be able to maintain herself, but will become weaker and weaker. With a cry of anguish he bids her to make a great and united effort to "close the stable

ere the steed be gone," to keep her "mugwort constantly on hand and ready for use," and then in the face of all the prejudices of his life he gives this practical and sensible advice: "Therefore let your majesties out of the deliberations of the high offices in regard to the coast defense come rapidly to a decision. Let railways and mines and the construction of ships and guns be undertaken at once, as a means of insuring our national prosperity and strength. As understanding is at the root of all successful undertakings, let your majesty the Emperor at the same time attend with more and more diligence to the study of our sacred books. Be not remiss even in the smallest matter. Associate daily with men of principle and listen to their counsels. Be sparing in every day life, that there may be a fund for unforeseen circumstances. Let the Emperor and his ministers strive with one accord, in all ways that are right, to do what is right, and your servant will seem in the day of his death to be born again into life.

"With gasping breath and flowing tears your servant humbly speaks these words, which are copied down to be submitted to careful consideration under your Majesty's mirror-like glance."

The significance of this Memorial is that it put the seal of Tso's conservatism and approbation upon what his great and progressive rival had already recommended, but so far it has borne but little if any fruit. The Throne is still surrounded by censors and sycophants, who are loud in the declaration that the occupant of the Dragon Throne, the Son of Heaven, is the fountain-head of all wisdom and virtue, and that he needs no one to tell him what is good and necessary for his Empire. Until

he can be aroused from this complacent but perilous lethargy, and be made to adopt the advice of such statesmen as Li and Tso as the policy of his reign, their words, however wise and statesmanlike, can do no more than familiarize the official class with the great ideas which underlie the prosperity and the progress of the modern world.

The censors are particularly vigilant, and more than once have they, by memorializing the throne and playing upon its ignorance and prejudice, or exaggerating those of the people, put a sudden stop to plans and projects which promised to ameliorate the condition of the Empire. The game of intrigue in which craft is arrayed against craft, money against money, and power against power, is going on all the time, and more than one censor has come to bitter grief by interfering with the plans of the great dignitaries of the Empire, who at a safe distance from Peking know how to silence those who oppose them, and unwittingly let it be found out. Human nature is pretty nearly the same in China as in other despotic countries. While the high and mighty prostrate themselves abjectly before the throne, and dare not so much as lift their eyes in the presence of the awful potentate who sits upon it—albeit he is but a puny and ignorant boy—they do not forget that they are the high and mighty at the seat of their provincial governments, and in turn they lord it over the unfortunate wights who fall under their sway.

But withal China has made substantial progress. The Missionaries, who now penetrate to its remotest recesses, and are permitted everywhere to teach religion, have familiarized the people with the fact that the for-

eigner is not necessarily a public enemy, but is most frequently an intelligent, humane and kindly person. The Missionary hospitals, presided over by competent doctors, never fail to make warm and devoted friends by their merciful ministrations wherever they are established. The number of Christian converts is small, but every Chinaman who comes in contact with foreigners at home or visits a foreign country, no matter how high or how humble his lot in life, becomes to a greater or less degree an advocate of our civilization and an apostle of progress, if not a devotee to our religion.

Commerce has familiarized the Chinese with the superiority of our arts, manufactures and sciences. Everywhere throughout the empire imported needles, thread, cotton cloth, matches, kerosene, and watches are making their way in larger and larger quantities every year. The steamship and steamboat have entirely supplanted the junk for navigating the sea and the great river of the country. And now the China Merchants Steamship Company, with a splendid fleet of vessels, owned and controlled by Chinamen, but all commanded by European and American masters, has as much of a monopoly of the government carrying trade as it dare give it. The canal still carries a part of the tribute rice to Peking, but in a few years that will also be given up to the steamships. This line had its nucleus in the ships built and managed by the great American house of Russell & Company, and during the Franco-Chinese War this house bought the line back and managed it with great success for a year, at the close of which, and when peace had been declared, it was resold to the Chinese Company.

But after all, war has made by far the greatest changes

in China. It has resulted in the organization of a navy, or rather of two fleets, one for the northern and one for the southern coast, composed of English and German built iron-clads of the latest pattern. The northern fleet is under a board of Admiralty composed of the Seventh Prince, the Emperor's father, the Viceroy Li, and Marquis Tseng, but really commanded by Capt. Lang of the British Navy. Arsenals and powder factories, furnished with foreign machinery and superintended by foreign managers, have been established at nearly all of the great cities, and are now engaged in turning out small arms and military munitions of greater or less excellence and in greater or less profusion.

A military telegraph line has been built by the government, aided in a few instances by a native commercial company, from Peking to the northeastern border to Korea, and to all the important maritime cities, and will soon be extended to all the provincial capitals. The construction and operation of the line is controlled by a Dane named Poulsen, and all messages are sent in English. An ingenious system has been devised, by combination of three numerals, by which messages in Chinese can be sent. A military and a naval academy have been established, and are beginning to turn out a few well instructed officers. Ship and dockyards have been located at Taku and Port Arthur for the repair and construction of ships. That at Port Arthur is at the N. E. extremity of the empire across the Gulf of Liaotung. It is badly situated, and has been the subject of much intrigue and contention between native and foreign officials.

A number of foreign instructors, mostly German,

have been employed to drill the troops, quite a lot of American rifles have been bought, and a number of Krupp and Armstrong cannon have been mounted upon the ramparts of the mud forts at the mouths of the principal rivers, but no adequate measures for the organization or administration of the military establishment have yet been adopted. A college for the instruction of advanced Chinese scholars in the western sciences was organized at Peking about twenty years ago, under the patronage of Prince Kung (the fifth brother of the late Emperor Hienfung), and it is presided over by Dr. W. A. P. Martin, of Indiana, and an able body of professors drawn from all countries. It is now full of middle-aged students, drawing instruction therefrom on history, international law and the exact sciences, but just what influence it is exerting in planting the seeds of modern progress no one can yet say. Doubtless its good work will become manifest in due time. Meanwhile it must not be forgotten that the Mandarins who are attending it are in the Imperial city of Peking, surrounded by agents of the censorate, and therefore necessarily on their guard against espionage and misrepresentation. Prince Kung is himself in forced retirement, if not disgrace, the students who were sent to the United States by him at the time of the Burlingame Mission have all been recalled, and are scattered throughout the country in subordinate and irresponsible positions. Many of these young men—they are nearly all young yet—are clever and bright, but they live in a land where youth is regarded as the sure index of immaturity and is deprived of all important part in the affairs of government. A number of them sought me out, and all had the same tale to tell,

the burden of which was—We count for nothing, we are looked down upon by the elders, and have no hope for ourselves or our country so long as the old condition of affairs prevails. They long for railroads, and mines, and furnaces and rolling mills, as the basis for a better order of things, and the man who can give them to China will be its evangelist and regenerator.

Now bear in mind that China is the poorest country in the world in everything except labor and undeveloped natural resources. It has absolutely no floating capital. Every official is afraid of his neighbor, and all are afraid of the government. The legal rate of interest is 37 per cent. per annum and money is never lent in the interior on bond and mortgage, or the best paper at less than 25 per cent per annum. No man is safe from spoliation or from forced subscriptions. The great men are under surveillance and subjugation to the throne, the throne is unapproachable to ordinary mortals, and even to the highest except under conditions and restrictions which are fatal to patriotic impulses and honest purposes. The parasites of the court, who are in daily contact with the Emperor and minister to his wants, necessarily control his mind, and even direct the powers of the government. Superadded to all this is the exclusiveness with which he is hedged about and which separates him from the world, and especially from the world of modern thought. Bear in mind, too, the fact that Chinese philosophy looks to the past and never to the future for wisdom; that only the old is valuable; that change is evil and progress destructive; that the highest questions of state are such as concern the Emperor's personal comfort; that the throne is the centre of all grace, all wisdom, all authority, and

that nothing out of the common run of custom can be legally done by anybody without its special sanction ; and finally, that nobody from the highest to the lowest wants ever to do anything, no matter what its public object or end, unless it shall also be profitable or advantageous to him, and you will begin to have a faint conception of the difficulties to be overcome before railroads can be generally introduced, mines opened, furnaces built and rolling mills erected.

The purchase of foreign iron clads, and the ownership of a fleet of merchant steamships, has rendered it necessary for the Chinese to mine coal in the modern way, and this has caused the construction of a short length of railroad running from the mines at Kaiping to the Peiho river.

When I was in China this road was only 7 miles long, but it ended at a canal which freezes in winter. It has therefore been extended across a barren plain and through a few miserable villages, and will soon form a connection between the mines and the river, as well as between Tientsin and Taku, the principal places on it.

The first section of this road was built surreptitiously, but its extension was formally authorized by the Viceroy Li, doubtless with the implied approval of the government, and under the auspices of the men constituting the China Merchants Steamship Company. Public subscriptions were asked to it from the officials and merchants, but they were not willing to trust a Chinese Company nor each other, and hence did not subscribe for a single share of the stock. The Viceroy and his subordinates have therefore been compelled to furnish all the money so far used. The work is done under the English engineer of the Kaiping Company, and I do

not doubt, so far as controlled by him, has been well and economically done, for he is a gentleman of undoubted ability and honesty. It forms no part of a general system of railroads for the country, and is so located that it can be readily seized and destroyed by any force landing upon the northern coast or invading the country.

This line of railroad is, however, where it can be seen by the Grandees of the Empire, whenever they choose to go to it, and hence it may prove to be some day the exemplar and justification for a more important and useful set of lines; but it is safe to say that before any general system of railroads can be projected and constructed, the whole system of Chinese government must be in a measure regenerated and reconstructed. The imperial treasury is in a chronic state of bankruptcy, and that bankruptcy has become more distressing than ever since the terrible inundations of the Yellow River in Honan and the costly and abortive efforts which have been made to turn it back into its old channel. It is now wandering about in the great plain south of Kai-fongfu, where it has destroyed thousands of villages, and hundreds of thousands of people, but how or where it finds its way into the sea, is not definitely known. The most reasonable supposition is that it runs into the Hungtse Lake, and thence through the lower section of the Grand Canal into the Yangtse-Kiang.

The Empress has followed her own judgment and ordered the breach in the great embankment to be repaired and the waters forced back into their former bed, but all efforts to this end have failed, millions of dollars have been squandered, wasted and stolen, and a number of the great officers connected with the work have been

banished to Ili—Chinese Tartary. This has had a bad effect on the others, and no one dares to make any suggestion, for fear he will at once be charged with carrying it out, and failing in it will also be banished. The government is paralyzed in the presence of this great disaster, and seems at last to have folded its hands in despair. The great Viceroy is sick and growing old, and, besides, has lately been reminded in most unmistakable terms that he is after all only a subject, whose will and wisdom are alike powerless unless the emperor and his guardians approve his measures.

Of course the first, indeed the paramount, need of the empire is that the public treasury shall be replenished, and this can only be done by a thorough rearrangement and reform of its entire fiscal system. Its principal sources of revenue are from the tax on land, from the salt monopoly, from the tax on goods in transit, and from the maritime customs. The tax on goods in transit was a war tax levied during the Taiping rebellion, and is an unmitigated evil which should be abated at once. The land tax, if honestly collected and accounted for, could, according to the best authority, be made to pay four or five times as much as it now yields. The same may be said of the salt monopoly. The Maritime Customs are ably and honestly administered under Sir Robert Hart, and yield with *ad valorem* duties of 5 per cent., about 20,000,000 dollars, clear of all expenses, in Mexican silver annually, and this is nearly all the pure money that ever finds its way into the treasury at Peking. Why such satisfactory results, contrasting as they do with all other fiscal operations in such a remarkable manner, have not induced the Empress or Emperor to also reorganize the other branches of their

fiscal administration, is more than any foreigner can find out. They must do it sooner or later, and when they do it they will also have to recast their whole system of government administration, adopting a set of responsible ministers, instead of the cumbrous boards which they now have. And when the fact is recalled, that these boards are composed of a set of Tartar and a set of Chinese officers to watch and hold each other in check, it will be seen that to break up the system means a revolution, or the masterful hand of a strong and enlightened emperor.

In conclusion, it is worthy of remark that China has been able hitherto to maintain upon her borders a series of dependent or vassal nations, which, whether so designed or not, have acted as buffers against the encroachments of her powerful and aggressive neighbors. But France has occupied Anam and Cochin China; Great Britain has subjugated Burmah and the Shan States, and now threatens to build railroads into Yunnan; Russia has taken all Siberia and vast regions in Central Asia, on the Amur and on the North Pacific Ocean, and is building railroads with wonderful speed across the steppes and arid plains, towards her borders, and now Korea has declared her independence and asserted her complete autonomy. Is not all this ominous of still greater trials and troubles for the Manchu dynasty which controls the destiny of the Chinese Empire? The two great Asiatic Powers are Russia and Great Britain. They have already dominated and divided Central Asia, and all of Western Asia, except Turkey. The tide of population and conquest has turned, and now sweeps irresistibly eastward. The political and commercial necessities of those Great Powers carry them

constantly onward, and they could not draw back if they would from the tasks still before them. They have prolonged themselves side by side to the plateau of Pamir and the heights of Burmese India; Russia has lodged herself firmly on the Amur and the shores of the Pacific as far down as Korea, while England has grasped all the borders of the Indian Ocean. Nothing stays their progress except China, which they now encompass about on every side, in the pathetic words of Tso Tsung-Tang, "like glaring beasts." It looks as though manifest destiny were working itself out in Asia as in America, and would not be satisfied till one or at most two flags float over the whole of that vast continent. Consult any good map, and, after considering the course of history, and the tendency of strong and aggressive nations, irrespective of mere numbers, to absorb the weaker and more inert ones, try to figure out the future of China. Isolation has saved her so far, but in a few years at most her isolation will be a thing of the past. The Marquis Tseng, late Chinese Ambassador to Europe and son of one of the two great brothers, says China is awaking from the slumber of ages. I have shown you that there is some truth in this—but after all, the great question, one of the greatest questions of all time, is will she, can she become thoroughly aroused and armed with the panoply of wealth and progress in time to save herself from the peril which now surrounds her? I do not hesitate to express the opinion that her government, as at present organized and administered, is totally unable to grapple successfully with the great questions which confront it. It is entirely out of date and touch with the living present, and so long as the governing class retains its conservatism and its exclusiveness, and wastes its time

upon the dry husks of a dead civilization, so long must all real and efficient progress and all genuine regeneration remain impossible. What China needs above all things is education in modern arts and sciences, and in modern thought and modern ways of government, not necessarily for the toiling millions but for the governing few. If by any chance the young emperor should turn out to be a strong man, of intellectual stature sufficient to see over the walls which shut out all ideas of the modern world, he might prove to be the saviour of his country, and start it bravely upon the march of progress. If he, or those who have guided him thus far, had the ability to select wise counsellors and to organize an intelligent and responsible cabinet, whose first duty it should be to reorganize and purify the general administration, and especially the fiscal system, the task of regenerating the country and saving it from dismemberment and subjugation, and by the same steps giving it railroads, mines, furnaces, rolling mills, machine shops and manufactories of all sorts-would be a comparatively easy one, but it would still require the constancy and courage of a great and powerful statesman to guide the Chinese government and the Chinese people safely into the harbor of assured peace, prosperity and happiness.

Whatever may be the outcome, it is evident that America has a greater interest in the regeneration of the Empire from within than any other nation. It should therefore keep a close watch on all that takes place there, and when it can do so, properly, it should lend a helping hand. A vast field will open there one of these days for American skill, enterprise and capital, if it be not occupied before by the conquering forces of one or the other of the great Asiatic Powers.

THE PORTUGUESE IN THE TRACK OF COLUMBUS (1493).¹

BY DR. P. J. J. VALENTINI.

FROM no one else was it more natural to expect a map of the discoveries made in the New World between the years 1492-1504, than from Columbus, the discoverer himself.

In these twelve years he had sailed four times to the Western Indies. The group of the Antilles and the chief outlines of the Caribbean coast had been first unveiled by him in person.

He could not therefore have been in want of inner prompting, of official invitation or of material for giving some illustrations of the work he had achieved. Nor was he deficient in technical ability, since it is related that for a long time he earned his daily bread in Portugal by drawing maps.

Nevertheless the researches made to find a chart drawn by his own hand, or any accredited copy of such a chart, have been without success, and after endeavoring to ferret out from written history any suggestion of his having ever been really engaged in such kind of work we are led to the conclusion that, in this direction, our expectations are hopeless.

If we begin by making inquiry about this matter of the contemporary writers, we shall find ourselves limited to a single passage of Peter Martyr,² in which this stu-

¹ Copyright, 1888, by P. J. J. Valentini.

² *Petr. Martyr, Ed. 1574, Dec. 2, Lib. 10, page 200.* In the translation of *R. Eden, London, 1577, on page 92.*

dious chronicler speaks of a Portuguese chart on which he had seen Columbus' discoveries noted. "Columbus also,"—so he writes,—“made the beginning of a similar chart and with the help of his brother Bartholomeo ; but the charts made by *Cosa* and *Morales* are the only useful ones.” As to the Portuguese chart mentioned, it has been recently discovered, and will form the subject of our special discussion to follow. The *Cosa*-chart has been in the hands of all students since 1812. But the *Morales*-chart, if such a one ever was separately drawn, appears to have been lost. The passage, as a whole, however, reveals the fact that Columbus must have attempted some such work, yet accomplished nothing of consequence, or worthy of preservation.

If we make inquiry of Columbus himself, we shall find him remarkably silent on this point. Fond of writing as he otherwise is, not one significant word escapes him as to the beginning or the completion of a work which would nowadays appear to us as an almost imperative duty for so successful a discoverer as he was. His reports and letters contain only a few rare and incidental remarks referring to what were then called “*pinturas* and *cartas de marear*.”

Columbus, however, must not be presumed to have been totally unconscious of a duty connected with his vocation as a first explorer. On the contrary, at least at the beginning of his career, he shows himself deeply impressed with such a duty. He has a clear idea of the extraordinary opportunities afforded him, and also of the extraordinary obligations they involved. His ambition is not only that of an impetuous discoverer—he wishes also to outshine all his predecessors in cosmographic

illustrations, and pledges himself to come back with a new map drawn by his hand of the western ocean and the new islands and countries contained therein. A promise so solemn as this he gave, and we may find it at the conclusion of a letter written to his sovereigns, on the eve of his second voyage.¹ It runs thus: "Moreover, Sovereign Princes, besides describing every night the occurrences of the day, and every day those of the preceding night, I intend to draw up a new nautical chart, which shall contain the several parts of the ocean and land, in their proper distinction as the compass shows, and also to compose a book to represent the whole by picture, with latitudes and longitudes. On all which accounts it behooves me to abstain from sleep and make many trials in navigation, which things will demand much labor."

There is no doubt that the first of these promises, to keep the ship's journal with the utmost accuracy, was observed by the Admiral. The original draft made of it on board the ship is lost; perhaps it was destroyed by himself. No matter; this record must have served him for elaborating, soon after his return, an extensive report, a copy of which he sent to the king, who acknowledged its receipt and says that he has read it. At the same time, however, he complains that Columbus has left him without the two charts promised, so that he does not know in what direction by the compass the new islands are to be reached and under what degree they were

¹ *Navarrete, Col. de viajes, Tom. I. page 1, 2, 3.* These pages contain the "Prólogo" to Columbus's book, which *prólogo* was left unabridged by Las Casas, and in Columbus's original wording; while the following pages, which contain the *Relacion del 1º viage* are only Las Casas's abstract made from the original text.

found to be situated. It appears that on the first complaint made by the king, Columbus excused himself for not being ready yet. Whether or not the charts were ready on the 5th of Sept., 1493, or delivered between this date of the second request¹ and that of the 25th

¹ Columbus's writings are not of the best Castilian standard, but oftentimes of hybrid wording and syntax. At this place, however, there is not much doubt about what he intends to express. He wishes to work out a complete chart of the discoveries made and to be made, and to present two specimens of the same. The one is to be drawn up in the customary way, that is, to show in what relation the parts stand to the direction of the needle, and from this to prepare one of the so-called compass-charts, as they were furnished by the cosmographers and used by all the mariners of his time. The other specimen was to be an improvement upon the former. Columbus intended to represent the new islands and countries in conformity with their astronomical situation. This new method of map-projection had been often discussed at the court of Portugal, and Columbus had learned how to handle the quadrant and how to compute his longitude from lunar-eclipses by availing himself of the tables of Regiomontanus. It is in this light that we read the passage quoted, to which we should not have paid such close attention, if it had not attracted the notice and study of Mr. Ed. Breusing (see *Zeitschrift f. wiss. Geographie, Band II., Heft 4, Seite 190, 191*). Much as we are indebted to this distinguished scholar for the manifold instruction he has given us and the flood of light he has thrown upon the subject of mediæval navigation, we are sorry not to agree with him on the point he wishes to make in his article, by endeavoring to prove that whenever the Spaniards of the Columbian epoch employ the expression *carta de marear*, they mean by it the written book of *sailing instructions*. He could not select a passage more unfortunate for countenancing his statement than the one above mentioned. The words: *tengo propuesto de hacer carta nueva de navegar, en la cual situaré toda la mar y tierras del mar Océano, en sus propios lugares, debajo su viento*, express, without leaving any room for doubt, that he had in view to draw a new map, in which their proper situation should be given to the parts of the Ocean, and the whole be made up in the style of the usual compass charts, while the other map was to present itself in the new garb of parallels and meridians (por pintura por latitud del equinoccial y longitud del Occidente). Therefore, the passage shows just the reverse of what Mr. Breusing wanted to prove, and if summed up, contains: 1, the promise to keep the ship's journal; 2, to supersede the old compass-chart containing the sailing directions for the Atlantic islands, by drawing a new one, enriched with the results of the new discoveries to be made; 3, to incorporate the adventures of his voyage into a report (libro), this book to be accompanied, 4, by the illustration of another map, arranged according to meridians and parallels.

For the two letters of the King to Columbus, see *Coleccion de Documentos in-*

Sept., on which he left Spain again, nothing in the correspondence showed, and it is but fair to suppose that on account of the enormous amount of business which pressed upon Columbus during those days, he was unable to finish the chart.

Further on, no mention of any *pintura* or *carta de marear* referring to the second voyage is to be found. Materials for mapping were on the increase. Columbus after this expedition might certainly have drawn up a sketch of a small archipelago. He had discovered considerable new portions of the islands of Cuba and Hayti, the islands of Jamaica and Porto Rico, and the northern chain of the Lesser Antilles.

The picture might have been made still more complete from the results of his third voyage, in which he had looked with wonder at the face of a new continent, when sailing along the tract of coast from the north of the Orinoco River to the Pearl-Islands. It is here we meet for the first and only time with Columbus's personal testimony to the fact that he drew a *pintura* of the new country. In the report to the king on his last achievements, he begs his majesty to be satisfied, for the present, with what he is able to write and with the enclosed picture of the country.¹

ditos, Madrid, 1882, *Tom.* xxxviii., page 221. Barcelona, Agosto 18 . . . "e acordad vos de dejarnos la carta de marear." *Tom. id.*, page 240, the Queen to Columbus, Barcelona, Setiembre 5. . . "La Carta de marear que habiades de facer, si es acabada, me enviad luego." The King to Columbus, of the same date, see *Navarrete*, *C. d. V.*, *Tom.* ii., page 108: "Y porque para bien entender mejor este vuestro libro, habiamos menester saber los grados en que están las Islas y tierra que fallastes y los grados del camino por donde fuistes, por servicio nuestro que nos los enviéis luego; y asimesmo la carta que vos rogamos que nos enviádes antes de vuestra partida, nos enviad luego muy cumplida, y escritos con ella los nombres."

¹ *Navarrete*, *C. d. V.*, *Tom.* i., page 264: "Entretanto yo enviaré á vuestras Altezas esta escriptura y la pintura de la tierra, y acordarán lo que en ello se deba facer."

Now, if Columbus had resolved to put off his drawing of the new nautical chart to the time after his return from the third voyage, there were strong reasons why he should then have abandoned the whole idea. Juan de la Cosa, one of his former lieutenants, had hastened to anticipate him in such a work. Cosa's large map of the world had just then appeared (1500). The map not only contained Columbus's latest discoveries in the Caribbean Sea, but also Cosa's own explorations as far as the Gulf of Darien. What the jealous heart must have suffered from the publication of this splendid work, appears indirectly indeed, but plainly enough, from a letter of the 21st of August, 1501, written from Granada by Angelo Trevigiano to the patrician Domenico Malapirei in Venice.¹ "Columbus," writes Trevigiano, "is living here in this city poor, in great distress, and has fallen into complete disgrace with the monarch. I have requested him to draw a map of his discoveries for your Excellency. He referred me, however, to Palos, a seaport, where there are people enough that understand such things." We ask, was this curt refusal due to a want of time, to the feeling possibly of not being quite equal in technical training to the work, or to discretion towards his sovereign, or, perhaps, rather to injured pride? More or less, all of these reasons may have worked together. But, if there is still a doubt left in our mind as to what he positively meant by his refusal, his own words will disclose the truth as they stand written in the report he made to the King, dated Jamaica, 7th of July, 1503, after the completion of his fourth and last voyage.

¹ From *Ab. Placido Zurlo: Di Marco Polo ed. a. Viaggiatori Veneziani, Venezia, 1818, Vol. II., page 362, in note.*

"Every tailor's apprentice," he exclaims, "ventures to approach the government now with a petition for a patent of discovery." And in another passage, "One of my crew may now come and tell where the province of Veragua is situated! All they know about it is that they went to a country where there is gold in abundance. The way back no one shall find again; it must be discovered anew." Columbus had imperiously demanded from his sailors their notes, journals and maps. He wanted to keep to himself that "great secret of the province of Veragua." He left no *pintura* or *carta de marear* of this last voyage. It was only by means of personal recollections, that some old pilots of Columbus were able to re-discover, in 1510, the coast of Veragua, to recognize the harbors and the rivers visited with him before and revive the names he had given them in 1502.¹

If, therefore, we may no longer count on such good fortune as the finding of a chart, upon which Columbus had noted down his discoveries either separately or all in one general view, we have lately and quite unexpectedly had some compensation for such a loss. Mr. Henry Harisse, who has for years been working with great success in the department of bibliography of the Columbian epoch, has recently been fortunate enough to hit upon a great treasure. In the library of the Este family of Modena, he succeeded in digging out a large land and sea chart, containing a representation of all the dis-

¹ G. Fernandez de Oviedo y Valdés, *Historia gen. y nat. d. l. Indias, Madrid*, 1851-1857, Vol. II., Lib. xxviii., Cap. 1, page 467; and Herrera, *Hist. gen. d. l. hechos d. l. Castellanos, Amberes*, 1728, Tomo I., Dec. 1, Lib. iii., Cap. 2, page 172: "y dijo un marinero (Gregorio Ginovés) que se queria acordar de un puerto" . . . "y fué loado el marinero de hombre de buena memoria." *Id.*, Cap. 1, page 71 . . . "y lo que mayor dolor les causava era no saber adonde Veragua estava."

coveries made by the Portuguese in the Atlantic ocean down to the year 1502. Mr. Harrisse has had an exact fac-simile executed of this splendid map and has joined it to his work published on the Corte-Reales. Concerning the original we learn from a letter printed in this work that the chart was made at Lisbon in the year 1502, and at the request of the Duke Hercole di Ferrara, who wished to possess a complete representation of all the discoveries made in the Atlantic ocean down to that year. The letter and the chart show that this was secured for him by a certain Alberto Cantino.¹

This find is certainly to be regarded as one of the most fortunate that have ever been made in the department of cartography. The map must undoubtedly, as Mr. Harrisse very justly observes, be looked upon as one of the prototypes of those small and early representations of the New World, for which the Ptolemy Atlases of 1508 and 1513 became so celebrated. The same model was used by Schœner also in the year 1520. It must also be the same of which, as previously mentioned, Pet. Martyr spoke, and of which Am. Vespucci sent a copy to King René as an illustration of his "*Quattuor Navigationes*."

If the Cantino map does not furnish us with anything that is new within the compass of the first discoveries, it has the great advantage of presenting the old things in their authentic original and on the largest scale.

¹ See: *Les Corte-Real*, par M. Henri Harrisse, in Vol. III. of *Recueil des Voyages et de Documents, pour servir à l'Histoire de la Géographie, Depuis le XIII^e jusqu'à la fin du XVI^e siècle. Publié sous la direction de M. M. C. H. Schefer, membre de l'Institut et Henri Cordier*. For description and discussion of the Cantino map, see pages 52, 69-71, 87-90, 215. Compare also in Vol. I., H. Harrisse, *Jean et Sebastian Cabot*, pages 143-158.

Above all, we are now at last in a condition to examine the long-lost original drawing of that mysterious coast to the west of Cuba, of which the Ptolemies of 1508 and 1513 evidently give us but an imperfect sketch. The names of the rivers, lagoons and places can now be read in their original linguistic purity. In the light of this fact we are now able to study, in a more legitimate way, the often discussed problem, who the "*almirante*" really was, and to which nation, Spanish or Portuguese, he belonged, who between the years 1492 and 1508 succeeded in discovering a coast lying opposite the western cape of Cuba and stretching north as far as to the fiftieth degree. It has remained a puzzle to the students on what authority Ruysch, the editor of the 1508 Ptolemy, relied, when on an extra-sheet containing the first sketch ever drawn of the New Western World, he ventured to represent in the still further West a continental coast inscribed with the legend: *Huc Vsque Naves Ferdinandi Regis Hispaniæ Pervenerunt*. For so far as credit is to be given to written history, it was not till the year 1517 that the Spaniard Cordova discovered in the direction mentioned and at the place described the eastern coast of what is called Yucatan. In an edition of the Ptolemy (1513), the editors took care to present the interesting coast in a somewhat improved form. The scale was larger, the nomenclature more copious, the names themselves were given, not in Latin, as before, but in a kind of hybrid Spanish, and in Gothic type. In the preface was stated, that the original from which the copy had been taken, had been drawn up *per admiralem quondam serenissimi Portugalie regis Ferdinandi*. This statement was not less anomalous than the foregoing. Columbus had been

the only admiral created by and serving under King Ferdinand of Spain. He had remained unacquainted with the insular character of the island of Cuba, had never visited its western cape nor sailed beyond it to find to the westward a continent reaching to the far north. It were tedious to quote the host of learned disquisitions in which the attempt has been made to conciliate the two contradictory authorities, history and cosmography. No definite result was reached on any one point, either as to the nation which sent cruisers at that time to the west of Cuba, or as to the admiral who made the surveys, or as to the recognition in the mysterious coast of any portion of Central or North America. The names susceptible of interpretation did not afford the slightest suggestion as to the country to which they possibly pertained. But it would be unjust not to mention here the position which Mr. H. Harrisse has taken on the subject. He is the finder and the publisher of the Cantino map, and so far as our knowledge reaches he is also the latest of the critics who have discussed the question. He has brought to this task the whole amount and weight of his vast erudition. As always before, so here, and it is now a pleasure to follow him in his examination of the possibilities in the case, as to the country meant to be represented in the picture laid before our eyes, and the nationality and identity of its discoverer. Despite the mass of older materials at his disposal, and the additional find of the original chart copied by the Ptolemies, the result of Mr. Harrisse's investigation is only a negative one. He concludes that no one of the many navigators who are known to have sailed about those Western shores in those years can be presumed, with any show

of reason, to have been the discoverer. As to the coast itself, he sees in it a representation of the shores of the Mexican gulf, those of the peninsula of Florida, and in continuation those of the United States of America.¹

This conclusion surprised us, not so much on account of its tenor as for the very abrupt way in which it was stated. We expected Mr. HARRISSE to address himself to the examination of the long missing chart with the whole power of his wonted acuteness, to make it speak or yield up its secrets, and after having carefully gathered its utterances, to bind these into the bundle of a compact conclusion. He would thus have afforded to the student an insight into the logic of his statements. This he did not attempt to do. He seems to be almost regardless of the intrinsic importance of his treasure-trove. His eyes are open only to its exterior features. The description of them, indeed, is valuable, but Mr. HARRISSE points out no more than would have been detected, upon inspection, by any one else.

We have been brought to regard Mr. HARRISSE with feelings of respect and gratitude. The works he has published in the course of now fourteen years abound with new and correct information. He has succeeded in drawing from dry bibliography fresh fountains with which to quench the thirst of the historian and the geographer. His methods of research are exemplary. On

¹ Mr. HARRISSE's words run thus (see *C. Real*, page 87, chap. iv.: "Le littoral descend en une ligne presque perpendiculaire pour aboutir à une péninsule qui s'avance vers l'orient et se termine à la pointe occidentale de l'île de Cuba, dont elle n'est séparée que par une distance d'environ deux degrés. A l'ouest de ladite péninsule, on remarque une large échancrure, comprenant trois golfes. Il est impossible de ne pas reconnaître dans cette échancrure l'entrée du golfe du Mexique, dans cette péninsule la Floride, et dans la côte perpendiculaire le littoral des Etats Unis."

this occasion, however, he disappoints us. He ought to have presented us with reasons more palpable and more conclusive than those he has chosen to give for confining himself to the meagre statement of a merely personal opinion.

If, however, on the one hand, we are disappointed at the incompleteness which marks his examination of the chart, on the other hand we are gratified. He has left to other students an opportunity to complete his work—a chance rarely offered by him, and one which we now attempt to grasp.

After a close examination of the Cantino map we arrived at a result very different from that reached by Mr. Harris. In the coast west of Cuba we discern a representation of the peninsula of Yucatan, the three sides of which, however, the copyist felt compelled, for certain reasons, to straighten out into one single line. Of the twenty-two names, inscribed on the coast, two turn out to be indigenous names of localities well known to this day. Two other names refer to persons, dignitaries of the Portuguese crown. The remaining names are written in Portuguese. A further fact read on the face of the map is that the Portuguese crown kept a naval station in the Antilles, in a carefully concealed spot, undoubtedly to watch the progress of the Spanish discoveries. The reasons for so extraordinary a proceeding will be gathered from the contemporary history of the two kingdoms. The evidence, however, for the fact that the crown of Portugal really dispatched ships to the West Indies, and this immediately after Columbus's return from his first voyage, will be made clear from a correspondence between the King Ferdinand and Columbus.

444 *The Portuguese in the Track of Columbus.*

This is in brief a summary of the points to be discussed in the following pages. Each of these points is to be treated separately, and the story of the Portuguese ships sent out right in the track of Columbus's sailing route shall be first given.

(To be continued.)



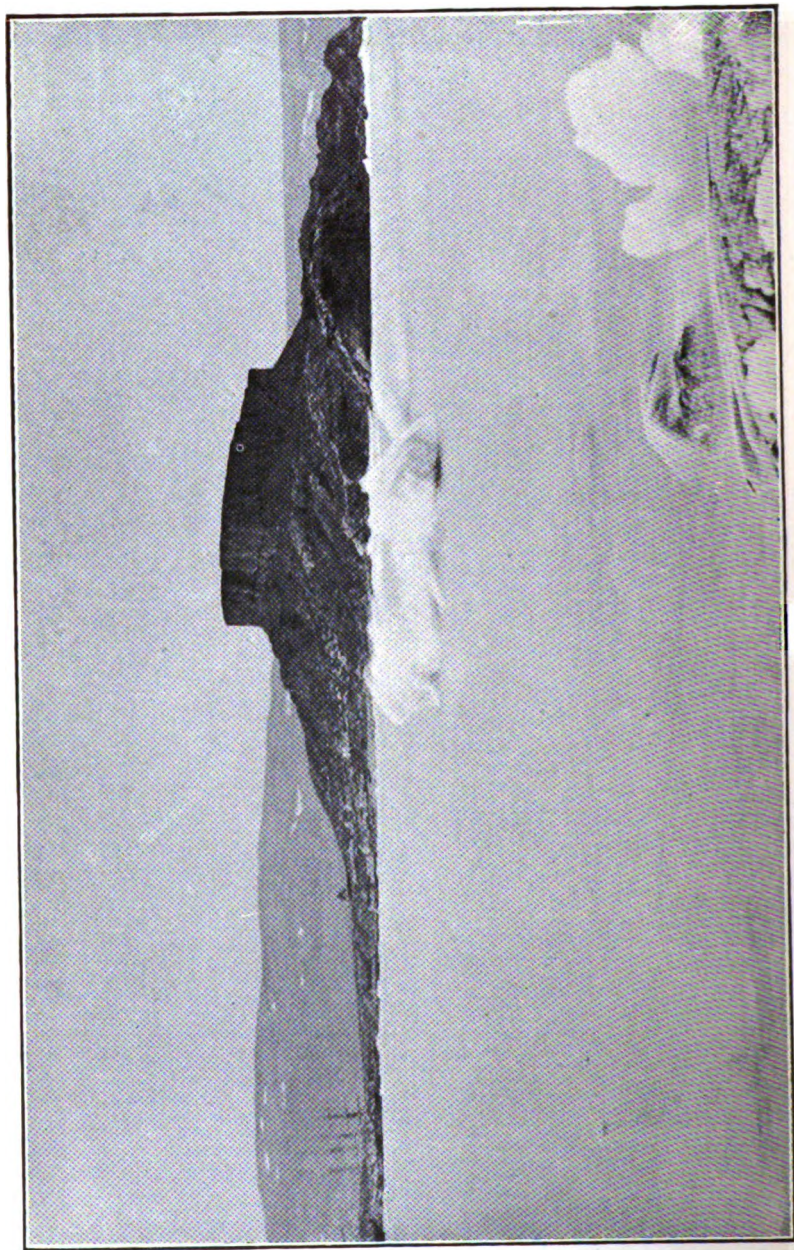


FIG. 6.

LABRADOR, HENLEY HARBOR AND CASTLE ISLAND.

From a Photograph by W. BRADFORD, Esq.

A SUMMER'S CRUISE TO NORTHERN LABRADOR.

II. HENLEY HARBOR AND CAPE CHARLES.

BY

ALPHEUS S. PACKARD.

As we entered Henley Harbor the scene was unique. The straits were clear of ice, though a few days earlier the harbor had been packed with it, and remnants were stranded along the shore, or carried hither and thither with the tides. The outlines of some of the pieces were beautiful; many were painted with green tints while the sun was high, but later in the afternoon the greens were succeeded by bright azure blues, contrasting with the almost cobalt blues of the distant Laurentian hills. The entrance to Henley Harbor is very fine, the sea cliffs being over 200 feet high, while behind are the peculiar outlines of the Laurentian gneiss, rising in long swells like whales' backs to a height of perhaps five or six hundred feet. Henley Harbor lies under the lofty, precipitous basaltic cliffs of the Devil's Dining Table, which caps Henley Island. We sail through a fleet of Newfoundland fishermen, whose low, thick masts, strong, clumsy rigging, and ironed and planked hulks—for they were sealers, and had not stopped to doff their ice-armor—contrasted with the beautiful model, slender,

tapering masts and spars of our fleeter craft. Their decks were crowded with men, women and children, dogs and goats, for these people had, like the old Norsemen, brought their families and stock with them for a summer's stay on the coast. Ashore, under the dark, beetling crag, lay the fishing hamlet of Henley Harbor. The houses were small and mean, the flat roofs of some covered with turf, the grass or moss growing on them, while the fish-houses and "stages" were of the meanest description.

After coming to anchor we were boarded by the captain of one of the sealers, a brigantine of perhaps 140 tons burden, lately in from Carbonear in Conception bay. Her bows and also her sides were planked and heavily ironed to resist the ice in the spring-sealing in the Gulf. The captain had, immediately after discharging his cargo of sealskins and blubber—and the smells rising up through the hold and companion-way proved the fact *ad nauseam*—only delayed long enough in port to put in 130 bushels of salt, and then cleared for the Labrador coast without stopping to strip off the outer planking. The captain was an intelligent, stalwart, English-born man only twenty years old, who had been to sea for six years. He was frank and communicative, and in half an hour gave us some insight into the mysteries of fishing and sealing. He had inherited the business, his father having been a sealer for fifty years. He owned the vessel and had brought along a cook; he took, passage free, eleven families, numbering 130 souls, men, women and children, with goats, dogs, cats, and provisions for the whole party, and was to land them at some harbor on the coast north of the straits, where they might

spend the fishing season in their rude summer houses, called "tilts."

During the voyage up the women are stowed aft and in the hold, and in a storm—and when are there two continuously pleasant days on this coast?—the hatches are battened down, the food is handed to them through a hole in the cabin, and then they are left to take care of themselves as best they can until the storm clears off, when the hatches are removed, and the forlorn passengers can take a breath of fresh air.

The captain does not take an active part in the fishing, but makes his profits by charging for freight on the fish. If the season is a good one and his vessel is soon filled, he goes back to Newfoundland and charts more vessels to carry back all the fish which have been caught. The season lasts from the end of June until about the 20th of October.

The season for the seal fishery during the past spring was from March 25th until June 4th. The gulf, of course, was filled with ice, no water being in sight from shore. A successful "catch" of seals is "better than 9000." Each vessel carries fourteen boats, which are piled up on deck; four men man a boat; each man is provided with a gaff or boat-hook and a piece of ratline three and one-half fathoms long. On coming up to where the seals are lying, the crew land on the ice. The sealer runs up to a seal lying near its hole, which may be only a rod or so from the vessel or boat, clubs it—and it is easily stunned and killed with one or two blows—sculps it, then peels off the skin and blubber, leaving the carcass on the ice-floe. Each man can tie up five seal-skins, and drag them to the vessel, and sally out again, rushing

ahead and racing with the other crews of "bloodhounds." The scene is one of excitement and peril, the ice constantly endangering the vessel, which is liable to be "nipped" and founder, leaving the ship-wrecked sealers to burn their vessel and make their way ashore over the ice. One of Mr. Bradford's most successful paintings represents a sealer "nipped" by the ice, the crew abandoning her after having set fire to their vessel, and walking in mournful steps over the ice in the direction of land. The delicate blues of the ice, the sullen neutral tints of the sky, the red glare of the flames breaking out of the burning ship, and the warm tints of the costumes of the men in the foreground, vividly portray a most tragic scene, enacted only too often on the Gulf of St. Lawrence.

To return to our statistics—a "crew" of sealers on the ice is composed of fifty men; each one, if successful, securing five seals. Two hundred and fifty pelts may be brought back after each sally from the vessel. In this way, when the seals are abundant, from 2500 to 3000 sealskins are taken in a single day, 9000 making a cargo. The shares in the enterprise are £60 each man. The captain takes half, "leaving the men in the lurch," as our informant said, which being interpreted means that the men realize little or no profits from the voyage.

A sealskin is worth \$4.00, a full cargo, perhaps, selling in the rough to traders for \$30,000 or \$40,000; the profits on a full cargo are therefore considerable, but the men's "half," being distributed among a large number, does not amount to much for each man. This spring (1864) the seal fishery was a failure.

The young seals are killed by knocking them on the head with a boat-hook or club, and the old ones by shoot-

ing them with heavily loaded old muskets. The hunters make holes in the ice and then watch for their heads to appear above water. Of all the different kinds of seals, the Greenland or harp seal is the most ferocious.

The summer at Henley Harbor was a very backward one; the salmon had not yet appeared at the mouths of the bays and rivers; nor had the cod and their natural food, the capelin, moved in from the deep water. The enormous extent of floe-ice which skirted the coast had lowered the temperature of the sea; at the same time the ice-fields had prevented any icebergs from entering the straits. The prevailing winds were cold and easterly; the cold climate, the strong tides and the three-knot Labrador current passing around the cape into and down the Straits of Belle Isle, render navigation here uncertain and dangerous.

June 27. The light south-easterly wind brought into the straits the fog which had lain all the day previous outside of our harbor, and inland the clouds rested on the hills; the day being dark and lowery. In the morning some of us rowed three miles up to the head of Pitt's Arm, in Temple Bay, a deep fjord penetrating the high gneiss hills, into which pours, over a stony channel, a rapid trout stream about five yards across. The sandy beach was an ancient sea-bottom containing deep-sea shells.¹ On each side of the mouth of the brook were two terraces; on the upper terrace, which was about forty feet above the sea, were two winter houses. I particularly observed the appearance of these houses. One

¹ The shells were *Buccinum undatum*, a variety with two ribs on the whorls; *Saxicava rugosa*, *Mya uddevallensis*, *Macoma proxima*, *Serripes groenlandica*, *Natica clausa*, of large size, and a branching polyzoon, *Celleporaria surcularis*.

was 21x15 feet in size, the walls of upright, thick boards, the frame of poles; the flat roof was constructed of poles placed near together and covered with birch and hemlock bark, the strips, which were a foot wide, being placed crosswise; the eaves were scarcely five feet above the ground, and the floor was in part of boards and in part of turf. The door, hung on iron hinges, and closed with a wooden latch and string, was only four and a half feet high, and there was a single window, 16x15 inches. Within were three beds and a settle. The lumber for these shanties had evidently, by the piles of sawdust near by, been sawn upon the spot and taken from the Labradorian forest of firs near at hand, which measured twelve inches through at the butt, and were about twenty feet high. In their branches a robin and a sparrow were flitting about. The willow bushes were here five feet in height. On the sides of the sandy terraces were blackberry and raspberry bushes, and currants, shadberries and golden thread just in blossom, while the alders were still in flower.

I dredged in water about fifty fathoms deep, in Chateau Bay, bringing up among molluscs fine large *Leda pernula*, *Astarte banksii*, *Lyonsia arenosa*, *Cardium islandicum*; rare sandstars, and young and old Arctic crabs (*Chionæetes opilio*).

The 28th was almost wintry in its cold, changeable weather. A northeast storm raged, with a few drops of rain and a little snow in the forenoon, while after dinner there was a thick snow storm, the hill-tops being whitened with snow for several hours, which, however, disappeared by the evening. The water in the harbor was intensely cold, and the *Mertensia* and *Clione*, those beautiful creatures of the icy seas, abounded.

The forenoon was spent in examining the trap rocks on the harbor side of Henley Island, and in shore-collecting. The rock-weeds or fuci do not grow luxuriantly on the coast of Labrador, but are stunted and dwarfed, like their more highly-born relatives of the vegetable kingdom ashore. Below tide-mark, however, though the tide on the Labrador coast rises and falls only two or three feet, the Devil's Apron or *Laminaria* is seen, but not so common and large as on the coast of Maine. Life between tide-marks is scanty compared with the New England coast. We never detected the common whelk that gives the purple dye (*Purpura lapillus*); but the two *Littorinas* (*L. rudis*, less commonly *L. littoralis*), were common; these are circumpolar forms, abounding at the water's edge at Greenland.

In this region scarcely a sea-bird was to be seen, and rarely even a gull; but on one occasion three ducks, while a lonely raven flew about the cliff. Insect life was scanty, and with the animals and plants showed in its appearance a strange intermixture of what at home would have been characteristic of early April and late May. Frogs are seen here, we were told: in the garden the turnips were just up.

Thirty years ago there was but a single house at Henley Harbor, and none at Red Bay, where now there are thirty. The fish and birds here, meanwhile, have vastly decreased in numbers. The fish are principally cod, salmon and herring. Old Captain French, our pilot, never saw a hake on the Labrador coast, and only two haddock, though both kinds are abundant and troublesome to cod fishermen at Bay Chaleur, on the New Brunswick shore.

Detained another day by headwinds and rain in the early part of the day, the wind in the evening hauled around to the S.W., giving us a fine evening sky. I dredged in the morning in the rain over the side of the vessel in four fathoms, the bottom rich in the red sea weed (*Ptilota*), the Desmarestia, and the sea-colander (*Agarum turneri*), and besides a portly queer-spined amphipod (*Ampithonotus cataphractus*), which carried its brood of young, also bristling with spines, a fine large *Crangon boreas* with other bright red shrimps came up, with a singular, large, active, leech-like worm (*Pontobdella*) attached; besides a beautiful shell-less mollusc, there occurred a species of *Eolis*, unlike any seen before. In the afternoon we sailed out two or three miles to the mouth of the harbor, and dredged in from ten to twenty fathoms on a hard, pebbly bottom, evidently the continuation of the beach, and showing that the land was formerly at least from 100 to 300 feet higher than at present; besides *Lyonsia arenosa*, *Kennerlia glacialis* and other shells and crustaceans, the interesting *Nebalia bipes* was taken: it was also found in as shallow water as four fathoms. This form is less than half an inch in length and is found throughout the Arctic ocean, is common on the coast of Norway, and its genus is now regarded as the sole existing type of a distinct order (*Phyllocarida*), whose gigantic fossil prototypes, some of them nearly two feet in length, occur in the palæozoic rocks in America and Europe.

The next day also we were wind-bound, but the gale was from the south-west; the wind blew very fresh, having a good sweep over the Gulf, the breakers ran high, as nearly all the harbors in Southern Labrador, *i. e.*, south

and west of Belle Isle, are exposed to gales from this direction. We put out our kedge anchor, and frequently had to haul in a part of the cable to keep the vessel off the rocks. We should have put out to sea and taken advantage of the gale to go on our course up the coast, but were afraid of running upon a sunken rock at the mouth of the "tickle" or narrow passage forming our harbor.

A part of the day was spent about and upon the Devil's Dining Table. This is a mass of columnar basalt, which has been described by Lt. Baddely in the Transactions of the Literary and Historical Society of Quebec for 1829. The height of the rock above the sea is 225 feet, to the base of the pillars of basalt 180 feet; the height of the columns themselves being 25 feet. The columns are quite regularly prismatic, and of nearly the same size and nature as those of the Giant's Causeway.

Ascending the terrace, carpeted with the mountain trident, we climbed up the cliff over the basaltic steps, by the only means of ascent situated on the eastern side, where the columns had been worn away by a little stream, on top of the flat table, which was 125 paces broad at the widest part. The ends of the prismatic columns occasionally protruded through the dense matted covering of curlew-berry or *Empetrum*. The air was cold, chilly, reeking with the sea-drift, and the gale buffeted my face as if a demon were trying to throw me over the cliff, down to the sea-margin of former days.

From the summit of the table the view was an interesting one, though the atmosphere was very hazy. Belle Isle was shut out of sight by a thin bank of fog or thickened vapor which lay on the sea to the eastward. A few

miles up the shore was another cliff of basaltic columns, the bases of the pillars wrapped in snow. There are in this bay eleven sea-terraces which mark the former levels of the sea, eight of which could be seen from the top of this rock. On the west side the terraces slope towards the north, while on Castle Island they slope towards the southwest. The most distinct example of these terraced sea-beaches lay at our feet, forming the western shore of Henley Island (on which the Devil's Dining Table is situated). This magnificent beach rises 180 feet above the sea-level, and when the sea covered it the waves washed the base of the basaltic pillars, as indicated by the debris of broken columns forming the talus at the foot of the cliff on which we stood. This beach is composed of three terraces, and the two lower ones widen out into delta-like expansions on the north-west end of the island, which are free from the usual covering of moss and curlew-berry, and are so distinctly marked with windrows of pebbles and gravels that it would seem as if they had been but yesterday thrown up by the waves.

Greville's Fort,¹ as we may name it, the ruins of which are quite distinct, was built on a broad terrace not far above the sea. On the mainland, north a little east, are three beaches with two terraces, which were beautifully marked, and corresponded with the two lower terraces at our feet, though covered with the rich deep green of the *Empetrum* leaves. Pitt's Arm and Chateau Bay are also terraced, the beaches themselves of unequal size and

¹ According to a writer in *Harper's Magazine* for May, 1861, who describes this fort and gives a plan of it, the fortifications were supposed to have been constructed by the French Canadians, by whom it was abandoned in 1753; another author states that it was built by the Acadians.

height, but the terraces, as we should expect, are of even height throughout, as they mark the former level of the sea. One of the beaches on Chateau Bay was remarkably steep, composed of large, sea-worn boulders, and overhanging like a precipice the winter houses below. Indeed, all along the Straits of Belle Isle from the Mecatinas to this point, wherever there is sand, gravel, or boulders, the sea has, when at higher levels, rearranged and sorted them into terraced beaches or sea-margins. The future geologist who visits this coast will have an interesting task in measuring the heights of these terraces and comparing them with those of Northern Labrador, of Arctic America, of Greenland, and Northern Europe. These beaches are also seen in inland river-courses, and by every pond and lake; they are not, as along the coast of Maine and Massachusetts, concealed by vegetation, bushes or forest growths; but here, owing to the absence of bushes and trees, they were as distinct as if the Labrador peninsula had been upheaved but a year ago. Darwin has studied the formation of the terraces along the coast of South America, where the elevating forces were undoubtedly volcanic, but the nature of the causes which in the northern hemisphere have resulted in the secular elevations and depressions of the land, such as took place during and after the glacial period, is purely conjectural, and belongs to the domain of theoretical geology. To study the causes we must first learn the facts, hence the careful examination of the oscillations of the eastern coast of America from Aspinwall to high polar latitudes is of the first importance. The measurement and comparison of the ancient sea-beaches in a coast like that of Labrador and Arctic

America, where they are so easily perceived, will well repay the labor and time involved.

Robert Chambers's interesting work on the ancient sea-margins of Norway and Sweden gives valuable data for comparison with those of the opposite coast of Labrador, and from the rough observations which have been made it would seem that the oscillations were about the same, both in height above the sea, and in time, on each side of the North Atlantic. I have also seen well-marked terraces in Puget Sound which are beautifully marked, and these should be carefully measured and compared in height with those in the Arctic region and Labrador. It was with no little interest that we observed the old beaches on the Labrador coast, and we shall note their occurrence in the following pages wherever seen.

We remained on the top of the Devil's Dining Table until the sun had set and the darkness began to creep over the scene below. Whether his Satanic Majesty was concerned in the transformation which then came over the scene we will not undertake to say, but as the sun went down the rocks and hills beneath seemed to diminish in height; an undefined, subtle, neutral tint spread over the landscape; a brownish haze due to the vapor in the air came in from the sea and settled over the hills far and near, and as the twilight came on the hills were still more dwarfed in size, when the chill southwest wind from the Gulf, the coldest that blows over this exposed point, sent us back to our vessel, where the thermometer at 8 o'clock in the evening was 44° F.

The fishing hamlet of Henley Harbor consists of a few dwelling-houses, some of them inhabited during the winter, with fish-houses and light wharves here called

“stages.” The winter houses are built of thick boards, with flat tarred roofs, the sides of the houses being well battened. The domestic animal here is the dog, Newfoundlanders—seven of them at one house—brought up by the fishermen for the summer: there were no Eskimo dogs or Eskimos at this point, though in the last century they here congregated in hundreds. The fish-houses were rude structures of one low shed, roofed with turf and built on piles, reminding us somewhat of pictures of the ancient pile-dwellings of prehistoric Switzerland.

The fisherman's sail-boat is a ponderous, clumsy affair called a “jack.” It is twenty-five or thirty feet long, with not much breadth of beam, rudely built, with short masts, and small sails stained red or black, or with both colors; the oars are of spruce, and very large and heavy, and the stern of the boat is provided with two stakes, such as whalers use for sculling.

I interviewed a Mr. Stone, one of the settlers, regarding the fisheries and hunting at this point, and he gave me the following facts: At the height of the herring fishery in August—and it should be borne in mind that this fish is only a summer visitant, not spawning on the Labrador coast, but passing up, as Hind in his work on the Labrador peninsula states, as far as Hudson's Strait—Stone has caught 200 barrels in a season. He has to pay twelve barrels for a hogshead of salt, the price of which is now (1864) very high. He secures 800 quintals of fish at 18s. a quintal, which amounts to £720 for a successful season's work. He can cure the fish on this coast during the short summer, and is now building a shed for this purpose.

Of salmon 180 quintals are taken in a good season;

they are pickled and sell at the rate of \$5.00 a quintal (112 lbs.), so that he would realize about \$900 from this fishery ; but considering that he had a family of ten children, it is not probable that on the average he more than comfortably supports his family, and in many summers the fisheries on this desolate coast are a failure. And to show what little chance there is to retrieve his fortunes by the products of the winter's hunting, he told me that last winter nothing was shot about Chateau Bay from Christmas until the first of February. During the entire winter but a single partridge was shot, while at the same time they were very abundant at Blanc Sablon, showing that possibly these birds are somewhat migratory, going in flocks from one point to another in search of food. There are now neither beaver nor otter, nor silver nor black foxes to be had ; only two or three wolves were shot, and two deer. When I asked him what the people would do if the hunting and fishing continued to fall off, he replied hopefully, and in his fisherman's dialect, " Oh, we'll have a spurt by and by." He added that the S. W. wind was in summer " the coldest wind that blows." Winter comes on in November ; by the 10th to the 20th of this month the lakes are all frozen over, and by the 20th the harbor is frozen far out into the Straits, while in winter they can go out in sledges on the ice to Belle Isle.

The people here in general were well-mannered, though rough and out-spoken, asking freely of our stores, and commenting as freely on what they considered poor returns in trade.

To return to the Devil's Dining Table, whose geology is interesting ; it is a high ovate mass with vertical sides and a flat top, which slightly inclines towards the

southwest, and consists of two layers, showing that the rock is the remains of two separate eruptions, the lower consisting of regular prismatic five-sided columns, each about two feet in diameter, fluted on the sides and curiously worn by transverse impressed lines. The basaltic mass rests upon the upturned edges of strata of Laurentian gneiss which have been penetrated by dikes of syenite. North of the basaltic cap, the underlying rocks are least disturbed, being reddish gneiss-like or foliated syenite, crumbling and quite fissile, dipping at an angle of 50° south, 25° east; just beyond, this reddish rock runs into the usual dark Laurentian gneiss of the region. Upon submitting a specimen of the basalt to Mr. J. S. Diller, lithologist of the U. S. Geological Survey, he tells me that it is a doleritic basalt.

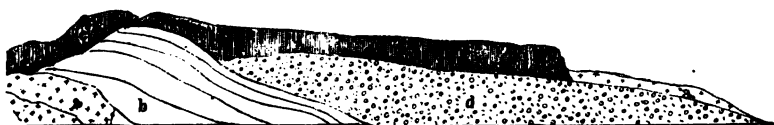


FIG. 5.—Castle Island from the West ; *a*, red syenite ; *b*, gneiss ; *c*, basalt ; *d*, raised beach.

At the southeast end of the island, along the shore looking out towards Belle Isle, the flesh-colored syenitic rocks present a rough and broken front to the ceaseless swell of the Atlantic, rising from seventy-five to a hundred feet above the waves, the beetling crags broken and pierced by deep ocean caves ; with jutting headlands and little pebbly beaches nestling between them—all the characteristic scenic features of this syenite, whether at Nahant, or Mt. Desert, or on the Labrador coast.

The southern end of Castle Island repeats the geology and scenery of Henley Island, but a little farther

down, away from the sea-cliffs, the syenite and gneiss meet, and seemed splashed together, like two masses of paste or dough which has been stirred up and baked. In places, both rocks were interstratified, dipping north and south in much disturbed strata, but with a general inclination toward the north.

The first of July saw us released from our prison ; the day was clear and delightful, and a light southwesterly breeze bore us along a remarkably bold and picturesque coast. About two miles from our harbor is another trap overflow capping and, at the southwest end, concealing from view the syenitic base ; at the northern end the basalt is columnar.

We soon came up to our first iceberg, a magnificent pyramid of ice perhaps a hundred and fifty feet high, white as Carrara marble, smooth, as if fresh snow had fallen on it during the past night, lending it a virgin whiteness, here and there brought more clearly into relief by the subtle azure blue reflected from the sea. Across its base ran several suggestive cracks, and though we sailed within two hundred yards of it, it was rather risky, and we remembered Scoresby's stories of the disasters attending the overturning and breaking of floating bergs. Captain Handy, whose life-long experience as a whaler in Arctic regions made him a good judge, remarks as we are passing that a berg will not usually injure a vessel unless a piece of ice falls upon it, but that the waves will swamp a boat. At Resolution Island he rowed past an immense berg, so that it could almost be touched from the boat, saying to himself, " It won't last three weeks ;" he had gone scarcely three ship's lengths, when, with a report like the discharge of a park of artil-

lery, it burst into a thousand pieces, many still forming large bergs; the boat was put head-to, and nearly filled with water, but there was no further danger.

Off Cape Charles the coast grows more broken and hummocky, more so than west of Chateau Bay. This is partly owing to the fact that we look directly up into the fjords and bays, and that the headlands run out towards us. We pass Battle Island, a comparatively low land,



FIG. 6.—A, Cape Charles, 654 ft. B, Hare Island. Entrance to Cape Charles Harbor. C, Charles Bay.

with the “ice-loom” or mirage resting over it. We were glad to pass Battle Island Harbor, which has a bad reputation, or, to use an Anglicism, is a “nasty” place. The entrance is very sinuous, the turns short, and the vessel must answer her rudder quickly when going in. Our fishermen enter it late in the season, as “it is a place that holds fish late.” Perhaps half of the harbors here



FIG. 7.—Outer Battle Island seen from the Southwest; A, Caribou Island.

are unknown, and the fishermen seldom have occasion to enter the innermost ones.

The ice-pack which we were soon to encounter lay north and east of us, with the “ice-blink” over it. We pass Outer Battle Island, and the “Two Sisters,” bare, low islands of nearly white gneiss rock. We now sail into the ice-pack, and are gradually surrounded by floes, though they are not near enough to impede our progress.

The shore of Caribou Island—for there are two of this name on the coast—is of a singular pale gray shade from top to bottom. The people ashore, struck by our model and spars, so unlike the other craft on this coast, set the British flag to ascertain our nationality.



FIG. 8.—Caribou Island, bearing two miles West.

We pass St. Lewis Bay, a large broad indentation, with its north shore evidently syenitic, as the sea-wall is high, and the rocks rough and fissured, and more broken than lower down; the headlands of syenite probably extend out from the gneiss mainland.

The ice-floes become larger and more hummocky than any we have seen before. A humpback whale now presents a broadside view of himself, with his angular hump, small fin, and as he “sounds,” reveals the pale underside of his tail and flukes.



FIG. 9.—Caribou Island, bearing West.

At Spear Point the outline of the coast is very rough; at the entrance to Spear Harbor, which is a shallow bight, there is a high, sugar-loaf island; two black-sailed “jacks” are entering it. Cape St. Francis is a bold, syenitic headland. Over Square Island, which now comes in sight, being fifteen miles ahead, there is a fine mirage, with castle-like, shadowy forms resting on the rock. We are now sailing between the ice-pack and the shore, one nearly as solid in appearance as the other.

The wind is still off shore, but should it change to the eastward the ice would come in upon us and choke up the bays and harbors. Behind us is a pale bluish haze which passes into a well-marked mirage, and as we sail on it raises the higher points of the land beneath, and expands above with weird, strange effects. Beyond us the mirage magnifies the larger floes into huge bergs.



FIG. 10.—North side of Fishing Ship Harbor.

In St. Francis Harbor is a "room" and a "look-out" house; a small bay beyond appears to be filled with ice. The coast at Fishing Ship Harbor is unusually rough and broken, like the waves of a chop-sea; and there appeared to be two terraces at this point, the upper one very high, but whether of gravel or of rock was difficult to distinguish. The wind now became very changeable and baffling, veering from one point to another; and our progress was compared by the Captain to sailing up the Potomac. Passing by perpendicular sea-cliffs, and a bold



FIG. 11.—Occasional Harbor.

headland on which are dead spruce trees, the rock on the north side of Occasional Harbor changes its character, becoming a gray, Labradoritic syenite, like what we afterwards found on Square Island.

After being for two weeks detained by floe-ice in Square Island, we reached Hopedale July 30th, and after spending a few days with the Moravians and Eskimo, turned our prow homeward, reaching Boston Sept. 4th.

THE PAST HISTORY OF VULCANO.

BY

PROF. EMILE CHAIX.

GENERAL interest, not unaccompanied in some persons by astonishment, having been awakened by the sudden announcement of the very recent eruptions in the little island of Vulcano, on the northern coast of Sicily, I am induced to present here an outline of its past history, which shows that its volcanic character has been long established.

I must, at the same time, confess that this recent convulsion would have been more ably treated by our fellow-citizen, M. Henry de Saussure.

The Lipari, or Æolian, Islands form a group of seven large and twice as many small islands. All are of volcanic formation, and, taking them as a whole, they offer all the various stages of that formation. Some are quite extinct centres; in others the springs have remained warm, and the fissures, or *fumarole*, are still active vents, from which carbonic acid and steam are ejected; and in others, again, the *fumarole* yield a greater variety of products, such as sulphydric and sulphurous acid, boracic acid and hydro-chloride of ammonia. Stromboli, the most north-easterly of the group, is in a state of incessant activity, with explosions every ten or fifteen minutes; while its nearest neighbor has had, like most

volcanoes, long periods of rest, broken from time to time by paroxysms of renewed energy.

This is now the case with Vulcano. In appearance this is the most forbidding of all the islands. With the exception of a few green patches of recent creation its surface is a mass of bare volcanic rocks of every possible hue, from deep black and vivid red to spotless white. Its steep shores are inaccessible on nearly all sides, and the sternness of its appearance is heightened by the contrast with the lovely green plantations and renowned vineyards of Lipari, which is but a mile beyond it. Vulcano has a superficial area of about 10 square miles, and, according to Fuchs, its highest ridges are 1338 feet above the sea, an elevation nearly equal to that of Stromboli. Notwithstanding its small size, it is geologically extremely interesting, and among its products are the volcanic brown enamel, or glass, called obsidian, pumice, and sulphur, both of old and of later formation, in great quantity; and, though of rare occurrence, boracic acid.

During the Middle Ages, Vulcano passed for an abode of the damned. St. Calogero, the Bishop of Lipari, having charitably banished thither all the fiends from his own bishopric, and forbidden the faithful, on pain of perdition, to approach the island.

Later it was occasionally visited by the more daring for the purpose of collecting a little sulphur and boracic acid, but for a long time the only permanent inhabitants were rabbits. Towards the end of the 18th century, when superstition began to lose some of its terrors, the Neapolitan Government settled two keepers in the place to look after the products. Subsequently, at a

date which I have been unable to fix, an Englishman, or Scotchman, established himself in the island, and planted vineyards, built wine-cellars and a chemical factory and an elegant villa; but these works have all been destroyed and the tenants have abandoned the spot.

It is Herodotus (475 B. C.) who first mentions Vulcano, under the name of Hieræ, as the vent of a subterranean forge of the god Hephæstus, or Vulcan.

Its first eruption is said by Aristotle to have occurred a century later. Other outbursts are mentioned by Strabo, Callias, and Diodorus. We learn from Eusebius that about A. D. 200, a small islet (afterward known as Vulcanello) rose from the bottom of the sea, close to the shore of the larger island, to which it has been united since the year 1550 by an isthmus, mainly composed of ashes. With all these evidences of activity there have been, nevertheless, long intervals of repose in the history of Vulcano. It was visited in the 17th century by an Italian monk, and, in the year 1727, by Dorville, a Dutchman, who was compelled by a sudden eruption to make a hasty retreat from the ridge of the crater. A more successful visit was made just thirty years after by William de Luc, of Geneva.

It was he who first descended into the crater; and to do this he let himself down through a cleft made by the rain in the vertical walls to the depth of 180 feet. Nearly choked by the offensive vapors, he reached the bottom, which was a mass of smoking *fumarole*, and crossed it in its whole diameter of 750 feet.

In 1775 there was an eruption, and the island was still in a disturbed condition when Dolomieu, the famous geologist, made his exploration in 1781. The crater was

completely altered, and the depth was increased from the 180 feet measured by de Luc to more than 1300 feet, which brought the bottom to the level of the sea.

A descent into this gulf was out of the question. Stones dropped from above were received in two basins, which seemed to contain molten sulphur, and the sides of the abyss were coated with the same substance.

Spallanzani was the next observer. His first visit was made in 1788, two years after an eruption, which had so impressed the people that they tried to deter him from making the attempt. He found the crater partly choked up by slag and scoriæ, and yet hot enough to make him glad to step on the projecting masses, which afforded a relief from the burning heat that scorched the soles of his shoes.

He had to guard himself even more carefully against the vapors that issued from a swelling in the centre of the crater ; and at night flames rose with the vapors.

From the time of Spallanzani's observations until 1873 and 1874 Vulcano was in the condition of a mere *solfatara*, a little more active than the one near Pozzuoli.

The eruptions which broke its long rest have been described by Prof. Mercalli and carefully studied by Mr. Picone, of Lipari, whose zeal for science has often led him into very serious dangers. The outbreak of 1873 began (like the one of the present year) with a fall of ashes as white as snow. This lasted for a few hours, the accumulation attaining a thickness, on a level, of about one and a half inches. Ink enough has been shed in discussing the origin of this shower to blacken the whole mass. Baltzer, a German naturalist who observed the crater from its edge, in 1874, estimated the depth at

282 feet, and Mr. Picone, in trying to ascertain the depth of the scoriaceous layer, had driven his rod through a bed of pumice, 23 feet thick, when it was suddenly ejected by the bursting out of a new *fumarola*. Other eruptions, principally of smoke and steam, occurred in 1879, 1882 and 1883.

Mr. Picone, who has frequently descended into the crater by night as well as by day, verifies Spallanzani's observation of pale flames issuing from the crevices and the *fumarole*; and he saw, as Dolomieu did, a little pool, 25 feet in length, of molten matter, that spouted up when stones were thrown into it.

The eruption of 1886 destroyed much valuable property, and the inhabitants of the northern part of the island abandoned the place.

Volcanoes are subjected to great alterations. Vulcano, for instance, has had three craters in activity at once, then one, then two, then one again. Its central summit is now formed of a high cone, rising from the middle of an older and lower one (just as Vesuvius rests on the Somma), and with a new smaller cone at the bottom of the present crater.

One feature alone is permanent: a large fissure called Maestro Rosario, held to be unfathomable, and the source of a constant and very powerful ejection of steam.

The fits of wrath of Vulcano being generally followed by long periods of repose, it may be expected that when its roaring voice is once more hushed, the island will again be settled by industrious colonists, heedless of the dangers that lurk in the future.

GENEVA, September, 1888.

LAKE MISTASSINI.

BY

GEORGE C. HURLBUT.

THIS lake is first mentioned by Father Charles Albanel, S. J., who discovered it in 1672, in his voyage, begun on the Saguenay River and continued beyond the portages across the lake and down Rupert's River to James Bay.

Father Albanel's account is in these words: "On the 18th (June) we entered this great Lake of the Mistassinins, which is held to be so large that to go round it takes twenty days of fine weather. The Lake takes its name from the rocks that fill it, which are of a prodigious size. There is a number of very beautiful islands with plenty of game and fish of every kind; and elks, bears, caribous, porcupines and beavers are there in abundance. We had already made six leagues through the islands which break it up, when I beheld as it were a height of land from as far off as the eye could reach; and I asked our people if it was towards that place that we were to go? 'Hush!' said our guide to me, 'do not look at it, if thou wouldst not perish.' The Savages of all those regions imagine that whoever wishes to cross this Lake must carefully avoid any curiosity in looking at this course and, in particular, at the place where he is to land; the mere sight of it, they

say, causes the disturbance of the waters and rouses tempests that chill the very boldest with terror." *

Father Albanel reports no more, and Michaux, who saw the lake in 1792, made no survey.

His account is given by Hind, *Explorations in Labrador, Vol. II., pp.* 147-148, in the following words:

"Leaving Lake St. John, he ascended the Mistassinnj River, or Rivière des Sables, 150 miles long and navigable for canoes to a distance of 120 miles from its mouth. Here he met with a cascade 80 feet in height; and from the summit of the hills near the cascade, a chain of lakes occupying a long valley leads to the dividing ridge, where a little tributary of Lake Mistassinni takes its rise and forms the canoe route. Early in September the cold on the Height of Land was severe, and snow fell. On the 4th of the month, Michaux arrived at Lake Mistassinni.

"This vast lake, little known except to the servants of the old Nor' West Company, occupies an area between the 71st and 74th degrees of longitude, and beneath the 51st parallel. It discharges itself into Hudson's Bay by

* Le 18. nous entrâmes dans ce grand Lac des Mistassiriniens, qu'on tient estre si grand, qu'il faut vingt jours de beau temps pour en faire le tour; ce Lac tire son nom des rochers dont il est remply, qui sont d'une prodigieuse grosseur; il y a quantité de tres-belles Isles, du gibier, et du poisson de toute espece; les originaux, les ours, les caribous, le porc-épic, et les castors y sont en abondance. Nous avions déjà fait six lieues au travers des Isles qui l'entrecourent, quand j'aperçus comme une éminence de terre, d'aussi loin que la veüe sè peut estendre; je demanday à nos gens, si c'estoit vers cet endroit qu'il nous falloit aller?

Tais-toy, me dit nostre guide, ne le regarde point, si tu ne veux perir. Les Sauvages de toutes ces contrées s'imaginent, que quiconque veut traverser ce Lac se doit soigneusement garder de la curiosité de regarder cette route, et principalement le lieu où l'on doit aborder; son seul aspect, disent-ils, cause l'agitation des eaux, et forme des tempestes qui font transir de frayeur les plus asseurez.

Relation de la Nouvelle France, en l'Année 1672, p. 49.
Relations des Jésuites, Vol. III., Québec, 1858.

Rupert's River. . . . In Michaux's manuscript notes the following description of the Mistassinni country is given : In the neighborhood of Hudson's Bay and the great Lake Mistassinni, the trees which, some degrees farther south, form the mass of the forest, have almost entirely disappeared in this latitude, in consequence of the severity of the winters and the sterility of the soil. The whole country is cut up by thousands of lakes, and covered with enormous rocks piled one on the top of the other, which are often carpeted with large lichens of a black color, and which increase the sombre aspect of these desert and almost uninhabitable regions. It is in the spaces between the rocks that one finds a few pines (*Pinus rupestris*), which attain an altitude of three feet, and even at this small height show signs of decay. However, 150 miles farther south, this tree acquires a better and stronger growth, but it never rises higher than eight or ten feet." Besides the pine, Michaux mentions the following trees and plants: the dwarf birch (*betula nana*), juniper bushes, wild gooseberries, the Indian tea (*Ledum palustre*), and some species of blackberries. It is only of late years that exploration has been attempted.

The earliest delineation is by Franquelin in his "Carte de la Louisiane ou de Voyages du Sr. de la Salle et des pays qu'il a découverts depuis la Nouvelle France jusqu' au Golfe Mexique les années 1679, 80, 81 et 82, par Jean Baptiste Louis Franquelin, l'an 1684, Paris."

This map is described by Mr. Parkman (*Discovery of the Great West*, pp. 410, 411), and after him by Mr. H. Harrisse, in his *Notes sur la Nouvelle France*, No. 222. The original MS. map was in the Archives of the

Dépôt de la Marine, at Paris, but has disappeared. A copy, made in 1856, is in the Parliament Library at Ottawa. It is to this copy, no doubt, that Mr. E. E. Taché, Ass't Commissioner of Crown Lands, Quebec, refers when he says* that "it gives a rather imperfect indication of this lake, which he (Franquelin) calls

* In the following letter to Mr. Francis A. Stout, of this Society. It is apparently by a slip of the pen that Mr. Taché makes the date of Franquelin's map 1688.

QUEBEC, October 1, 1888.

FRANCIS A. STOUT, ESQ., VICE PREST. "AM. GEO. SOCIETY,"
29th street, New York City.

Sir:—In answer to your inquiry of the 3d ult., I beg to inform you that the "Great Lake Mistassini," respecting which a number of fanciful articles have lately been published, in certain American and Canadian journals, has been known for a long time, having been discovered in 1672 by the Rev. Père Albanel, S. J. A trading post was established upon it by the French about the end of the seventeenth century.

Franquelin, in his manuscript map of New France, dated 1688, gives a rather imperfect indication of this lake which he calls "Tamagamingue," a name properly belonging to a much less important lake in the neighborhood.

On a map of the region lying between Quebec and Hudson Bay, drawn by the Rev. Père Laure, S. J., in 1731, "Mistassini" is well represented. This manuscript map, which contains very many details and is drawn with great accuracy for the time, forms a part of the archives of the Ministry of Marine at Paris, and is reproduced in the collection of copies made by the late P. L. Morin for the library of the Federal Parliament.

The work of Père Charlevoix includes a map of the geographer Bellin, published in 1744, in which appear all the data given by Père Laure.

These maps, however, not being based upon any regular measurements, cannot be considered very correct. The first geodetic survey of Lake Mistassini was begun in 1873, by Mr. Richardson, of the Geological Commission.

In 1884, Mr. John Bignell, P. L. S., was placed at the head of an important exploring party, with instructions to minutely survey this great lake; but, through difficulties which arose between him and the party in charge of the geological branch of this exploration, he was obliged to abandon the work.

Mr. Lowe afterwards was entrusted with the expedition, and the result of his studies and researches are to be found in the reports of the Geological Commission of the Dominion of Canada for the year 1885.

The French fort called "des Dorval," according to Father Laure, stood at the outlet of "Little Mistassini" into "Great Mistassini." Mr. Bignell, jr., thinks that remains of this fort can be found.

Roberval never was at Lake Mistassini; there is not, at least, any historical record of such fact.

I have the honor to be, Sir,

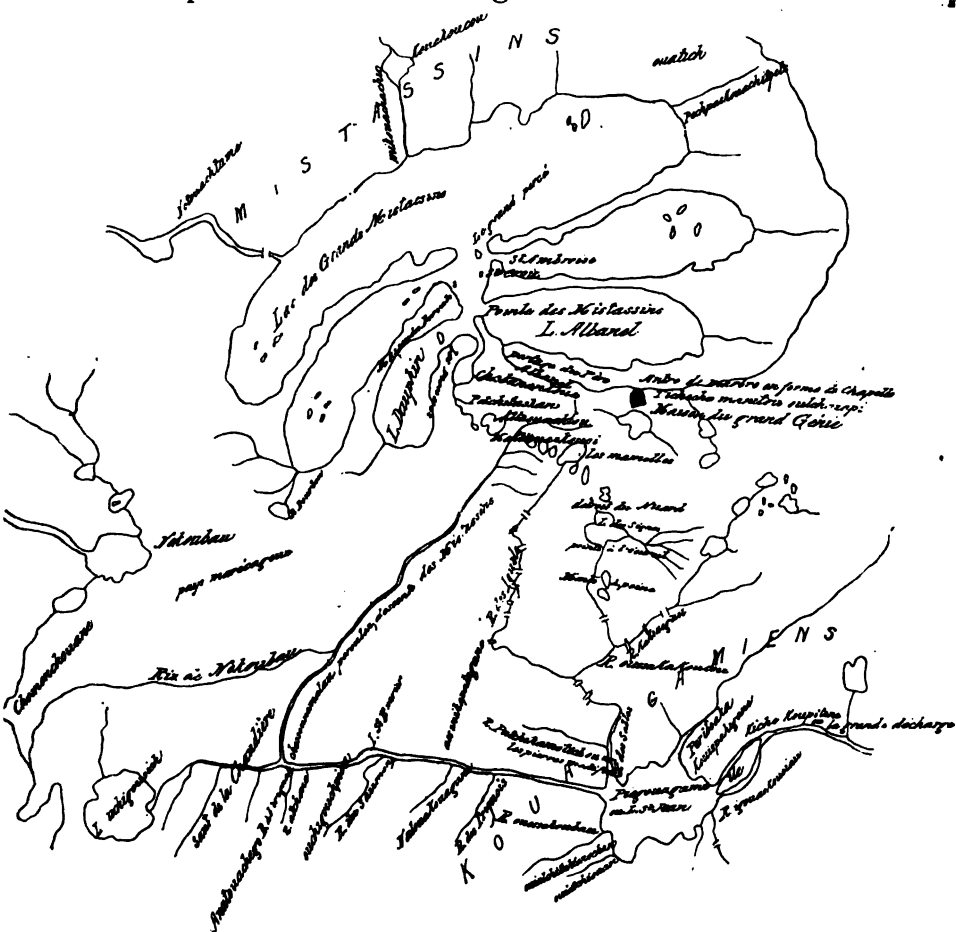
Your Most Obed't Serv't

E. E. TACHÉ.

Asst. Commr. of Crown Lands.

N. B.—Herewith enclosed, I transmit you a tracing of that part of Father Laure's map indicating Lake Mistassini and the country surrounding.

●



From a copy of the Map by Père Laure, S. J. (1731), in the Library of the Canadian Parliament. The original is in the Archives of the Ministry of Marine, Paris.

The Dépôt de la Marine possesses a MS. map of the country between Quebec and Hudson Bay drawn by Father Laure, S. J., in 1731. The portion of this map

relating to Lake Mistassini is here reproduced from a tracing courteously furnished by Mr. Taché.

In 1870 Mr. James Richardson, of the Canadian Geological Survey, was charged with the exploration of the country to the northward of Lake St. John. He made a survey of thirty miles along Lake Mistassini; but provisions failed, and he was obliged to leave the work unfinished. It was taken up the following year by Mr. Walter McOuat, who says, in his report :

"We measured on this lake a coast line of about a hundred and fifty miles, including no bays less than a mile in width. The main body of the lake was found to be of a very elongated form. . . . A series of long narrow islands, which were seen only from a distance, extends for many miles apparently parallel with the longer axis of the lake. We carried our measurements for about seventy miles from the extreme south-west point. As no land was visible from this position, looking in a north-easterly direction . . . the whole length of the lake cannot be much, if any, less than a hundred miles."

For a surveyor, charged with official duties, Mr. McOuat is less precise than he might be, and Father Albanel's guide himself could not have been more careful to leave things as they were. The dread of the lake tempests seems to have lasted till 1884. In this year an expedition was sent out under Mr. John Bignell, P. L. S., to make :

1st. A thorough survey, hydrographical and topographical, of Lake Mistassini, especially of the northern and eastern portions not examined or surveyed by the Geological Survey parties under Messrs. Richardson and McOuat, in 1870-71.

2nd. A geological examination of the lake shore and of as much of the adjacent country as may be practicable.

3rd. A collection of specimens, vegetable, mineral and animal, illustrating the resources of the region.

This expedition, organized jointly by the Canadian Geological Survey and the Quebec Department of Crown Lands, met with only a partial success, Mr. John Bignell having been unable, "on account of some unfortunate misunderstanding, to carry out more than a certain part of the duty which had been assigned to him."* In his detailed report to the Commissioner, Mr. Bignell is silent on the subject of the misunderstanding.

He arrived with his party at the Little Mistassini on the 13th December and, continuing down the lake till the 19th, sent two Indians ahead to the Hudson Bay Co's Post for supplies. These men were met returning on the 21st.

On the 23d the party was met, when a few miles from the Post, by Mr. Wm. Miller, the gentleman in charge, attended by a number of his employees. The Post is a cluster of four or five buildings, including the Co's store. Here Mr. Miller has resided with his wife and family for a number of years, in a house furnished with the comforts of civilized life; and at the time of Mr. Bignell's visit, he was about erecting a small chapel. Some of his employees are also married men. The Post is supplied from Rupert's House on James Bay, to which Mr. Miller makes a visit once a year in June, with the furs that have been collected.

* Report of the Commissioner of Crown Lands of the Province of Quebec for the twelve months ended 30th June, 1885.

According to Mr. Bignell, good potatoes and other vegetables are raised, although the land has been cropped over and over again for many years, without ever having been enriched.

The Eskimo dogs, of which there are many at the Post, are employed in the winter for drawing the year's supply of wood for fuel, and in visiting the nets, some of which are set at a distance. These dogs are fed on fish in the winter, and in the summer forage for themselves.

The temperature at Mistassini runs to extremes. The thermometer often marks 50° or 60° below zero (Fah.) in winter, but the air is very dry. The snow-fall is heavy and ice forms to the depth of six feet. The bays are frozen in October or November; the great lake not till January, and the ice breaks up at the end of May or the middle of June. The summers are very hot, with frequent thunder-storms.

Fur-bearing animals, particularly beaver, otter, marten and black bear, are numerous; and the lakes abound with trout, jackfish, whitefish, pickerel, carp, and the "maria," a fish resembling the cod.

He visited the Marble Cave, marked on Father Laure's map, and found that it contained two rooms, the outer one about 18 ft. wide and 16 deep, with a roof 8 ft. high, the inner one 10 ft. deep, 8 ft. wide and 6 ft. high. The walls were of spar.

Mr. Bignell remained for several weeks at the Hudson Bay Co's Post, at Mistassini; and he makes the following remarkable statements as to the size of the Lake: "A very intelligent Indian, to whom I spoke on the subject, told me that some years ago he had met with an old Indian who informed him that from what he

knew, and from what he had heard, he thought that a good walker, carrying nothing but what he required for the trip, could in the spring, on the crust, go from end to end of the Lake in ten days. Now under these circumstances, as fifty or sixty miles per day would be considered but moderate, we may form an approximate idea of the extent of this Lake, and if we accept only half of this estimate, we may still call the Lake an immense one. The general opinion was that it could not be scaled around in less than one summer."

Mr. Bignell's faith is worthy of Sancho Panza's friend: "And he who told me this declared that it was so true that I might swear I myself had seen it." Stronger testimony could not be; but the Commissioner of Crown Lands accepts as final the plan of the Grand Lake Mistassini prepared by Mr. Low, of the Geological Survey.

"As I anticipated," says the Commissioner, "this sheet of water is not of the extraordinary dimensions assigned to it by certain parties from the exaggerated accounts which had reached them. Its extreme length is not more than ninety-five miles, nor its greatest breadth more than fifteen." If the "certain parties" are the intelligent Indian and Mr. Bignell, they have a grievance; for the document, which records their belief in the immensity of the Lake, is printed without correction as Appendix No. 38 to the Report of the Commissioner.

Mr. A. P. Low, B. Ap. Sc., who made the survey of Mistassini, was at first charged with the geological portion of the joint exploration. He tells, in his Report to the Director of the Geological and Natural History Survey,* that, while at the Hudson Bay Co.'s Post, he

* Part D, Annual Report, 1885.

had several disagreements with Mr. Bignell and found it necessary to go to Ottawa. He returned with instructions to take charge of the party. He began his survey where Mr. McOuat had left off on the west side, continued it to the north end and thence back down the east side, "connecting again with McOuat's survey at the Big Narrows," at the upper end of Abatagush Bay. The distances were measured with a Rochon micrometer, the angles with a transit theodolite, and frequent observations for latitude were made with the sextant as a check on the scaling. The work was done in nineteen days.

Mr. Low's report must be accepted, though it does not meet the requirements of a "thorough survey, hydrographical and topographical." The Lake is described as a long and narrow body of water stretching from N.E. to S.W., with a perceptible curve between the ends, the concavity of the curve being toward the S.E. It lies between N. Lat. 50° and $51^{\circ} 24'$, W. Long. $72^{\circ} 45'$ to $74^{\circ} 20'$.

The length is said to be *nearly* one hundred miles. At one place the Lake is very deep, "an isolated sounding, made in crossing, having given 374 feet at a point which, *I was informed*, was not the deepest part of the Lake."

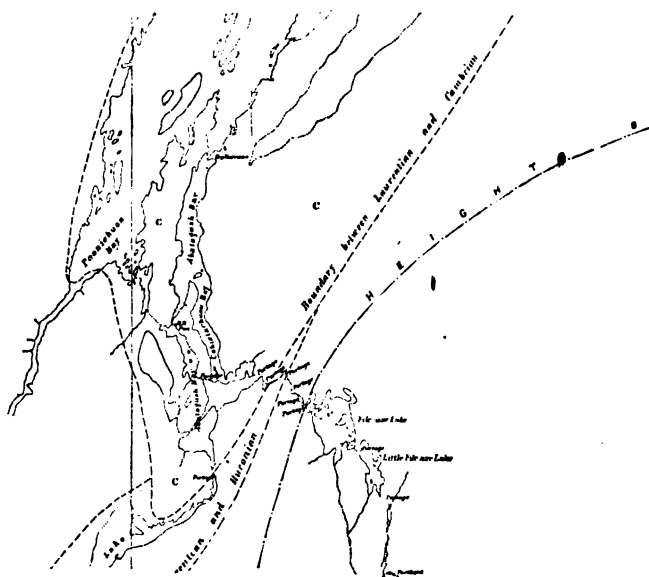
Poonichaun Bay,* which lies W. of Abatagush Bay, "continues in a south-westerly course for a long distance, *as the end was not reached* after ascending it fourteen miles. *The Indians say that a large river empties into the Lake at the head of this bay.*"

The italicized expressions do not inspire confidence

* Spelled *Poonichuan* on the Map.

in the results of Mr. Low's exploration; and there is work yet to be done before a true map of Lake Mistassini can be made.

That so little has been known of the Lake is the more surprising, seeing that the Hudson Bay Company have



LOWER END OF LAKE MISTASSINI.

From the Map in the Report of the Geological and Natural History Survey of Canada. Part D., 1885.

had a trading post on its shores for over one hundred years. "This post," says Mr. Low, "was first situated near the outlet, but owing to the difficulty in procuring an adequate supply of fish, the staple article of food, the post was removed, over fifty years ago, to its present position on the south-east bay. During the time of the North-west Trading Company, they also had a trading

post at the southern end of the south-east bay."* As to the climate Mr. Low says, on p. 16 of his Report, that the summer is shorter and colder on the main body of the lake than in the vicinity of the post. Where the trees were at all dense the low lands bordering the lake were frozen solid within a foot of the surface during the month of July. The Hudson Bay Post is the best point for agriculture, and here a poor crop of potatoes is raised yearly, the tops being always frozen before they mature. In the spring, as soon as the frost was out of the ground, Mr. Low sowed garden peas, beans, corn and turnips. On August 20th the peas were beginning to fill the pods, the beans were in flower, and the corn was eighteen inches above the ground; the turnips alone were growing nicely.

* *Geological and Natural History Survey of Canada, p. 13, Part D, Annual Report, 1885.*

THE PHILOSOPHY OF GLACIER MOTION.

BY

PROF. WM. LUTTRELL ROGERS, M.S.

HAVING described the development of snow into ice that takes place in the *névé* of a glacier, Prof. James Geikie goes on to say : " Thus solidified and apparently rigid, one would at first suppose that hardened snow or ice would be as immovable as the rock of the mountain upon which it reclined. We know that a bed of tough clay will rest upon a considerable slope without sliding downward, and even the loose stones and *débris* which cover so many hillsides in a highland country find repose upon an incline of 30° . At Fourneaux the *débris* shot from the mouth of the great Cenis tunnel forms a still steeper slope. Mr. Whymper tells us that its faces have as nearly as possible an angle of 45° . But ice, which is a much more rigid body than even the hardest clay, will move upon a slope that is inappreciable to the eye."*

Prof. Croll, in criticising Tyndall's *Regelation* Theory, also says in this connection : " I presume that few who have given much thought to the subject of glacier-motion have not had some slight misgivings in regard to the commonly received theory. There are some facts which I never could harmonize with this theory. For example, boulder clay is a far looser substance than ice ; its shearing force must be very much less than that of

* " The Great Ice Age," pp. 32, 33.

ice, yet immense masses of boulder clay will lie immovable for ages on the slope of a hill so steep that one can hardly venture to climb it; while a glacier will come crawling down a valley which by the eye we could hardly detect to be actually off the level."* It seems strange that such eminent glacialists as Geikie and Croll should compare "a bed of tough clay" or the loose stones and débris which cover so many hillsides, *in their inert state*, with the incessantly moving glacier. Both, to be sure, rest upon an inclined bed; but here the analogy ceases. The boulder clay or the rocky débris represent in the economy of nature lifeless, functionless organisms—those that have already fulfilled their mission, or else at most are endowed with potential energy from past activity. How different with glaciers! Stretching up into that region where the fall of snow during the year is largely in excess of that disposed of by evaporation or the occasional discharge of an avalanche, glaciers constitute one of the great links in the circulation of meteoric waters. The glacier then, unlike the débris or recumbent bed of clay, has its function—that of relieving the excess of snow and preventing an indefinite accumulation of the waters of the earth in their solid state upon the domes of the continents. Thus the glacier has its origin in, and is maintained by, this region of falling and fallen snow, its fountain head. Here, then, first of all, we should look for the cause of its motion. Geikie and Croll in the above statements evidently had regard only to the glacier proper, the "*glacier d'écoulement*" of Rendu, ignoring the névé or "*glacier réservoir*." As well, however, enter into the discussion of the philosophy of

* "Climate and Time," p. 497.

a river's motion and overlook entirely its source, as to inquire rationally into the motion of a glacier without due regard to its *névé*. Did the Mer de Glace, from its terminus at the sources of the Arveiron to its junction with its tributaries at Treleport, rest as at present upon its mountain bed, and all wasting away, from some conjunction of physical causes, were at an end, then I contend even were it upon as steep a slope as the clay or rubble it would remain as immovable as they *under like conditions*. But of course, because of the physical properties of ice, these conditions could never be realized in nature. Let us then look at the matter from the opposite standpoint. Did the beds of clay and heaps of rubble exist under like conditions to the glacier, even upon far gentler slopes than those mentioned in the opening quotations, they would move and frequently have moved with frightful rapidity, carrying wide-spread devastation in their wake. The "mass of chalk on the Dorsetshire coast," that in 1839 "slipped over a bed of clay into the sea," and the "thousands of tons of solid rock" that in the rainy summer of 1806, "suddenly swept across the valley of Goldau, burying four villages with about 500 of their inhabitants,"* will bear witness to this statement. Let, then, the heaps of "loose stones" receive constantly fresh accessions from the mountain-sides higher up, and the inertia of the mass will be overcome, its potential will be translated into an intense kinetic energy, and the entire mass, as it thunders down as an avalanche, will perform its function by relieving the mountain of its own wreck. Or let the clay have the cohesion of its constituent particles overcome by saturation from percolating waters,

* Encyclopædia Britannica, Geology.

and the attachment of its bottom weakened by the undermining and lubrication of underground waters, and the entire mass will be precipitated as a land slip. Both these conditions in a modified form would seem to exist in the glacier. The cohesion of its particles must become weakened by a partial melting; its bed must become lubricated by the streams of water that come from the melting of its surface, while the falling flakes of snow, that by their aggregate weight first urged the glacier down the mountain-side, must help maintain its motion. Tyndall long since pointed out this analogy between *moving* earth and moving ice. In speaking of the curves that sweep across some glaciers on the union of transverse with marginal crevasses, he goes on to say: "In land slips, and in the motion of partially indurated mud, you may sometimes notice appearances similar to those exhibited by the ice."* The discussion of the physical cause of glacier-motion would seem upon analysis to have reached the following stage of development: 1. It has been proved again and again by most accurate experiments that, independently of its motion as a whole, the glacier experiences a differential motion—a motion of *certain* of its constituent portions relatively to others: and further the same experiments have accurately defined just where the planes of swiftest motion lie, but it yet remains to be *conclusively* shown *just* what these portions are, their nature, size, and physical properties. 2. From all the known phenomena of glacier-motion there would seem to be two, and only two, of nature's great powers concerned in it—gravitation and heat. But it yet remains to be *conclusively* shown in *just* what way these

* "The Forms of Water," pp. 108-9.

forces act. He who can give answers to these two questions so correct that they will harmonize perfectly with each other and with all the known phenomena of glaciers and the laws defining their motion, will undoubtedly solve that problem which, up to the present time, has proved to be the most vexed in all physical science. It was the endeavor to do this satisfactorily that has led the most of our great geologists to formulate their now celebrated theories of glacier-motion. Let me, in a brief résumé, notice the most prominent of these.

After it became known that glaciers move—which was not until the eighteenth century—the most natural supposition of the early and superficial observer would be that they bodily slide over their beds as a slate would from a roof. Altman and Grüner, in 1760, were the first to formally propound this “*sliding*” theory, which was afterwards revived, in 1799, by the distinguished traveller and investigator, De Saussure.* In our own days Hopkins has so far modified this theory as to hold that it is the huge sections, into which the glacier seems to be divided by crevasses, that experience downward motion.

So early as 1773, Bordier of Geneva seemed to be struck by certain general resemblances between the motion of a glacier and that of a river, and held that “the entire mass of ice is connected together, and presses from above downwards, after the manner of fluids,” and that glacier-ice was like “softened wax, flexible and ductile to a certain point.”† In 1841, Rendu, the learned Bishop of Savoy, independently advanced similar views,

* “*Voyages*,” tome II.

† “*Picturesque Journey to the Glaciers of Savoy*.”

much more elaborate, however, as to detail. For he held that in glaciers, as in rivers, "the friction of the bottom and of the sides . . . causes the motion to vary, and" that "only towards the middle of the surface do we obtain the full motion." And further, that "glacier ice enjoys a kind of ductility which enables it to mould itself to its locality . . . as if it were a soft paste."* Unfortunately, he had no exact measurements by which to verify his predictions. It was left for the celebrated glacialist Forbes, the following year, to apply a crucial test of Rendu's generalizations, and his own, with the aid of the theodolite. He then conceived the idea that "a glacier is an imperfect fluid, or viscous body, which is urged down slopes of certain inclination by the natural pressure of its parts;" and that the molecules of ice must move over and past each other in their downward flow as those of water do in a river. Such is the substance of his well-known "viscous" theory.

Recent investigations have shown an undoubted viscosity in ice, especially snow-ice. Helmholtz made an extended series of experiments showing that snow can be changed into ice by pressure, and that crushed ice can be moulded into almost any form. Herr Pfaff of Erlangen later made investigations in the same direction. Tyndall had attributed apparent viscosity in ice when under pressure to crushing and regelation. Bianconi of Bologna declared that while Tyndall's experiments showed that such might be the case where the changes of form took place *rapidly*, they did not preclude the possibility of ice possessing a small amount of viscosity. He conducted a series of experiments in 1871 on plates and bars of ice

* "Théorie des Glaciers de la Savoie."

submitted to bending and torsion. These experiments showed conclusively, that *slow* changes in form in ice can occur without any crushing and regelation, although the slightest jar during bending would shatter the ice-plates. Furthermore the lower or convex side of the bending plate, as Prof. Joseph Leconte has pointed out, can experience neither crushing nor regelation, as it is under tension, not pressure. Afterwards Messrs Mathews, Mosely, Tyndall, and Heim obtained similar results. Prof. Bianconi and Heim further ascertained that granite pebbles and iron plates when slowly pressed into ice penetrated it as they would a viscous mass, the displaced particles of ice rising in a fringe about the intruding body. To preclude all possibility of regelation coming into play, Mr. Hungerford recently experimented with snow and ice under pressure, at a temperature ranging from 25° to 9° above 0° F. and obtained results similar to Bianconi's. All this points to a certain plasticity in ice, whether this plasticity be concerned in the glacier's motion or not.

Faraday long ago showed that two pieces of ice on being brought together would cohere or *regelate* at the points of contact. Tyndall calling attention to this property of ice holds in his well-known *regelation* theory, that it is the discrete particles of the glacier which experience differential motion, having first been separated from the parent mass under strain, moved downwards on momentary relief of pressure, and finally regelated under renewed pressure by the constantly acting force of gravitation. Croll, struck by the fact that ice is diathermanous, concluded that the only way heat could pass through it would be by successive molecular melt-

ings on the approach of the heat ray and resolidifications after its passage, the molecule of water giving out nearly the same amount of thermal energy that the molecule of ice had absorbed. In its liquid state the molecule occupying less space, and hence having room to move, would under the force of gravitation seek a lower level, there to resolidify and act as an entering wedge between adjacent molecules of ice. As glaciers must be penetrated by heat rays in all directions, Croll* concluded that the sum total of all such molecular transformations must constitute the distinct downward motion of the glacier. Such in brief is his *Molecular* theory.

Carnot observed that pressure lowers the freezing point of water, and Prof. James Thompson found by experiment that this amounted to 0.0075°C. for every atmosphere of pressure. The latter held† in his *Pressure-liquefaction* theory, based on this experiment, that the portions of a glacier at any instant, subjected to enormous but slowly applied pressure, would first liquefy, move downwards, and then resolidify, the pressure meanwhile being transferred to new portions.

The earliest theory to be advanced, as far as is known, was by Scheuchzen of Zurich, in 1705. He thought that the motion of a glacier must result from the expansion, at the moment of freezing, of the water in the body of the glacier, which percolated there through innumerable capillary fissures, from the melting surface above. J. de Charpentier of Bex, in 1841,‡ again brought forward the same hypothesis, and so far elaborated it that it is now

* "Climate and Time."

† "Proceedings of the Royal Society," May, 1857.

‡ "Essai sur les Glaciers," pp. 14, 103.

known as Charpentier's *Dilation* theory. L. Agassiz held the same views until he found* by experiment that the body of the glacier could not be the store-house of intense cold it was supposed to be, since, according to his results, it has a mean temperature of 32°F., whether that of the surrounding air range far above or below this. M. Forel questions these results, however, as we shall see later. Canon Mosely observed† that sheets of lead, when placed upon an inclined plane of too gentle a gradient to be affected by gravitation alone, moved downward when subjected to changes of temperature. He attributed this phenomenon to the superadded action of gravitation tending to lower the centre of gravity of the sheets by always favoring the downward movement—of the upper end when they contract, of the lower end when they expand. This experiment was the basis of his modified form of the dilation theory.

Fr. Jos. Hugi, the distinguished naturalist of Soleure, was the first to describe the granules of glacier-ice,‡ which he designated by the name "*cristaux du glacier*," and the first to advance the *Granular-dilation* theory of glacier-motion. He recognized the fact that the granules increase in size from the névé downward, and to the expansion force resulting from this growth he attributed the progress of the glacier. Ch. Grad later held similar views,§ and within the last few years Forel of Morges, has adopted and elaborated their generalizations in an article entitled "*Le Grain du Glacier*." || The nature of

* "*Nouvelles Recherches*," 1847.

† "*Proceedings of the Bristol Naturalists' Society*" (1869)

‡ "*Naturhistorische Alpenreise*," p. 341.

§ "*Les Mondes*," tome 35.

|| "*Archives des Sciences*," tome 7 (1882).

this granular growth, according to their hypotheses, is described by Forel in the same article: "It is the molecular affinity which causes the crystal to increase in the mother water, in which it is plunged. The crystal is placed under such conditions that it must increase in volume; it is bathed by the water at zero, which becomes colder; this water cannot part with its heat without changing its state, when it passes into the state of ice; this ice under the action of molecular forces, adds itself in new layers, in the same planes of crystallization, upon the periphery of the parent (*l'ancien*) granule. The crystalline granule increases in volume."* Prof. Arnold Guyot, the great Swiss savant, also refers to the part the granules of the glacier play in its motion. "Glacier ice, however, never loses the traces of its origin, but a blow of the hammer will cause it to crumble to pieces and reveal its granular structure."†

Such are the principal theories that have been advanced, stated as briefly as is consistent with accuracy, and without any reference to the warm and often protracted discussions that followed the presentation of some of them, notably Forbes's and Tyndall's.

I will now assume with Hugi, Grad, and Guyot, that it is the component granules of the glacier that experience differential motion, and then deduce from the laws and phenomena of glaciers the part, it seems to me, heat and gravitation must play in this motion. I have endeavored to show in the opening paragraphs of this article that it is of vital importance in this discussion to consider most carefully the forces at play at the

* "Archives des Sciences," tome 7, p. 351.

† "Physical Geography," p. 94.

source of the glacier. Let us then take as a typical glacier the Mer de Glace, and have regard to its principal source at the base of the Aiguille du Géant. The famous Col du Géant here constitutes the vast amphitheatre where year after year is collected the snow that falls upon its surface, and that which is shed from the rocky pinnacle which gives it its name. As the atmosphere of the Alps is moisture-laden, the snow-falls are in consequence large, and the waste by evaporation comparatively small, since the rays of the sun must often be screened off from the surface of the snow by clouds. The necessity then for some competent form of relief of the ever-accumulating mass of snow becomes patent, as the occasional discharges by avalanches are impotent to effect it.

The architecture of these vast beds of snow is clearly delineated at such points where a crevasse or bergschrunde exposes to view a natural section. Here the snow has been observed by Tyndall and many other investigators to be distinctly laminated, every pair of delicate blue bands traced along the snowy white mass defining the snow-fall for a given year. During the winter months the snow-fall is very large and of a dry, powdery nature. During the summer months it is small and of a moist, heavy nature, while the moisture is largely precipitated as fogs, mist and rain. In consequence, the snows of winter are gradually compacted and consolidated in summer by their superincumbent weight, aided by the various forms of precipitated waters and that which comes from the melting of the snow itself.

Prof. Tyndall has given the rationale of this process

of transformation of snow into ice. "At its origin, then, a glacier is snow—at its lower extremity it is ice. The blue blocks that arch the source of the Arveiron were once powdery snow upon the slopes of the Col du Géant. Could our vision penetrate into the body of the glacier we should find that the change from white to blue essentially consists in the gradual expulsion of the air which was originally entangled in the meshes of the fallen snow. . . . The snow which falls upon high mountain-eminentes has often a temperature far below the freezing point of water. Such snow is dry, and if it always continued so, the formation of a glacier from it would be impossible. The first action of the summer's sun is to raise the temperature of the superficial snow to 32° , and afterwards melt it. The water thus formed percolates through the colder mass underneath, and this I take to be the first active agency in expelling the air entangled in the snow. But as the liquid trickles over the surface of the granules colder than itself it is partially deposited in a solid form on these surfaces, thus augmenting the size of the granules and cementing them together. When the mass thus formed is examined, the air within it is found as round bubbles. . . . The frost of the succeeding winter may, I think, or may not, according to circumstances, penetrate through the layer, and solidify the water which it still retains in its interstices. . . .

"The ice of the *névé* at 32° may be squeezed or crushed with extreme facility; and if the force be applied slowly and with caution, the yielding of the mass may be made to resemble the yielding of a plastic body. In the depths of the *névé*, when each portion of the ice is surrounded by a resistant mass, rude crushing is of course out of the

question. The layers underneath yield with extreme slowness to the pressure of the mass above them; they are squeezed but not rudely fractured. . . . Thus, then, the lower portions of the névé are removed by pressure more and more from the condition of snow, the air bubbles which give to névé ice its whiteness are more and more expelled, and this process continued throughout the entire glacier finally brings the ice to that state of magnificent transparency which we find at the termination of the glacier Rosenlaui and elsewhere.”*

From data obtained by recent investigations concerning this evolution of snow into ice, M. Forel recognizes three distinct regions in a glacier, defining as many distinct stages of development :

“ 1. *Névé* (enfance du glacier). Excess of snow, the heat of summer not sufficient to melt the (entire) snow (fall) of the year. All the water produced is absorbed and assimilated by the profound icy layers: the temperature deep down (in the mass) much below 0°C. *Ligne de séparation*. The heat of summer sufficient to melt all the snow of winter. But there is no excess of heat to attack the ice.

“ 2. *Glacier adolescent*. The heat of summer melts all the snow of winter and attacks by ablation a portion of the ice. All the infiltrated water is absorbed and assimilated by the ice: the temperature deep down in the mass much below 0°C. even at the end of summer. . . . The region of growth, the region of youth, in which the glacier is developed. *Ligne de séparation*. All the infiltrated water is absorbed by the increase of the granule of the glacier. Commencement of the glacial torrent at the end of sum-

* “Glaciers of the Alps,” pp. 249, 250, 251, 252.

mer. At the end of summer the temperature beneath the surface reaches 0°C .

"3. *Glacier sénile*. The heat of summer is in excess; the infiltrated water exceeds the quantity necessary for the reheating of the ice, which remains at 0°C ., and the excess of water flows off into the glacial torrent. The temperature of the ice remains at 0°C . during summer. . . . The region of decrease, region of old age, when the glacier falls into decay."* The first line of separation is apparent upon the surface—the second is not.

As the physiological forces at play in animal organisms can best be studied in their embryos, where they are least complicated, so the physical forces at work in a glacier can best be investigated in the embryonic *névé*, before the *glacier d'écoulement* has seen the light of day. Now no one, so far as I am aware, has ever witnessed the birth of a glacier, but from the data furnished by those questioned in their old age, one can arrive at some sort of idea as to what must take place.

In the first place before the glacier, or even the parent *névé*, has appeared upon the scene, the climatic conditions of the region in which it is to have its birth must undergo a radical change. If previously dry, it must have its supernatant atmosphere laden with moisture. If moist before, it must at any rate have its mean annual temperature lowered to such a point that the moisture will be so largely precipitated as snow that the snow which falls will exceed that which is wasted. The once sunny skies are now frequently overcast with dense leaden clouds, the once genial air has taken on through a greater portion of the year an arctic temperature, while the oc-

* "Le grain du glacier." *Archiv. des Sc.*, tome 7 (1882) pp. 366-7.

casional downpour of a tropical shower has given place to long-continued and heavy falls of snow.

Gradually the rains and mists of summer, and the water from the melting snow, percolate through the dry mass. Gradually the now saturated beds become compacted in their lower parts by the pressure of those above, and consolidated by the frosts of winter. A part of the surface is licked up by the rays of the sun and the heated air, while from exposed rock surfaces huge shreds of snow are discharged as avalanches. But all this avails nothing in the face of the enormous falls of snow.

"Supposing," says Tyndall, "two feet of snow a year to remain upon the Col, this would raise it to a height far surpassing that of Mont Blanc in five thousand years. Such accumulation must take place if the snow remain upon the Col. But the accumulation does not take place, hence the snow does not remain on the Col. The question then is, whither does it go?"* Let us see. The accumulation evidently must go on until the cohesion of the mass is overcome by the enormous pressure brought to bear upon it. At this point and not before, the glacier first makes its appearance. When once started on its way down the mountain side, the glacier would descend below the snow-line to a point where its downward motion is just counterbalanced by the melting of the ice. Should the mean annual temperature of the region be raised or its humidity lowered, from some conjunction of physical or cosmical causes, the glacier will shrink in dimensions and the terminus will retreat up the mountain side. This retrogression has taken place during past

* "The Forms of Water," p. 49.

ages on an enormous scale, as old marginal moraines and stranded erratics clearly attest.

Having now traced out the life-history of a glacier, if I may borrow this term from Biology, let us revert to the main point at issue—the investigation of the causes potent in the creation and maintenance of its motion. As the superficial portions of the *névé* are comparatively light and dry, it must be from the more profound layers that the icy tongue is thrust forth. The distinct strata, prolonged from the *névé* into the glacier, that can be traced in horizontal bands along the icy walls of some crevasses, furnish an absolute proof of this assumption. Whatever may be the case later in its development, it cannot be the weight of the glacier itself which drags it down, as none yet exists. We can account for its first appearance only by supposing that it is *squeezed out* from underneath the *névé* by the weight of snow and ice above it.

When the glacier has attained its full size it seems natural, and I think that all the phenomena of its motion indicate, that the same forces that gave it birth must play a prominent part in its maintenance. We can, I think, see how the snow accumulating on the surface, and gradually compacting and settling down, must force out from its profounder depths fresh material to make good the terminal waste, and thus keep in motion the icy stream. This translation of downward pressure into a lateral thrust against the upper reaches of the glacier, causes the *névé* to act like a vast wedge. There is a limit to the glacier's power to resist its downward progress; there would be almost none to the increase of pressure coming from an indefinite accumulation of snow upon the *névé*. The

force then which *absolutely compels* the glacier to move, *nolens volens*, whether upon a steep or a gentle grade, whether rigid from the intense cold of winter, or mobile from the heat of summer, is the incessantly acting and enormous pressure exerted by the snows accumulating upon the *névé*. If last winter's snow-fall has not produced the necessary excess of pressure, next winter's will give another turn to the screw. In this vast ice-mill the power can be indefinitely accumulated—the resistance, so far from increasing, grows less.

Pressure, as Prof. James Thompson has proved, tends to liquefy ice by lowering the freezing point of water. Pressure then must also produce a partial liquefaction of the granular *névé*, tending to weaken the cohesion of its particles and facilitate its motion. Thus gravitation at work in the *névé* is concerned in the motion of the glacier, directly by forcing it down the slope, and indirectly by increasing the mobility of its particles.

Let us make a rough calculation what the total of this pressure must amount to in pounds. "It has been estimated," says Prof. Maury, "that the average annual snow-fall of the Alps amounts to sixty feet, which is equivalent to six feet of water."* Now a cubic foot of distilled water, at standard temperature and pressure, weighs a little over 74 pounds. So every year each square foot of the surface of an Alpine *névé* is put under a *fresh* pressure of above 444 pounds: Or take a glacier with a *névé* surface of a quarter of a square mile, and the *accession* in pressure *each year*, from the snow-fall alone, would amount to the enormous sum of over 1,547,251 tons. Let us go a little further: take 400 feet

* "Physical Geography," p. 94.

as the average depth of the *névé*, and it would doubtless fall below the average of many; then, as *névé* ice is "more than three times"* as dense as snow, the pressure exerted by the *névé*, upon its lower layers, and in consequence upon the upper reaches of the glacier, must be about 8,800 pounds, or over 4 tons to the square foot. Cut this estimate down one half, to allow for possible ever estimation of the density and depth of the *névé*, and we still have left a pressure of 2 tons to the square foot exerted against the upper cross section of the glacier. With such figures before us, I think it need no longer excite wonder that the *névé*, under the ceaselessly acting force of gravitation, can mould its own material, and become the principal factor in the glacier's motion.

Heat, the other great engine at work, plays its part, by causing the saturation of the snow with the water that comes from the melting surface, and further must assist gravitation in weakening the cohesion of the *névé*. Both of these forces are at work in the glacier in a modified form to *facilitate* its downward motion.

Before proceeding, however, let us first get a clear idea of the structure of glacier ice, and of the size, form and mode of aggregation of its component granules. "The glacier is therefore a mass of solid water of the special structure which mineralogists describe under the name of crystalline; it is an agglomeration of crystalline granules locked one within the other, as are the granules of crystalline marble or of a lump of sugar. . . . The crystalline granule increases in size from the top to the bottom of the glacier's course: at the limit of the *névé*, the granule is larger than a small hazel nut; in the

* "Physical Geography," p. 95.

middle portion of a large glacier, it is the size of a walnut; at the terminal portion that of a hen's egg. At the lower extremity of the Aletsch glaciers, the lower Aar and the Rhone, I have measured granules up to 7 and 8 centimeters in their major diameter."* . . . These granules (*cristaux*) have not a regular form: they are irregular polyhedrals, locked (*enchâssés*) one within another: the irregular curved faces of two neighboring granules are perfectly opposed to one another. So closely are these faces pressed the one against the other, that each granule retains the others in place and is itself retained by them, so that if "one succeed in disengaging one of the granules from a block of the glacier, then all the others disengage themselves more or less easily and the entire mass falls into separate pieces."†

So far we have treated of established facts. But when we would arrive at an accurate knowledge of the crystalline structure of the granules, we find that nothing as yet has been definitely determined. Brewster was one of the first to make use of polarized light in the study of glacial ice. Then Tyndall, in his celebrated experiment, by condensing rays of heat in the interior of a block of ice, disclosed its beautiful six-sided crystalline structure; for in the disk-like areas of fusion appeared the star-shaped "ice-flowers," as he called them. In 1861, Sonklar came to the conclusion from his observations that in a given granule the axes of crystallization were parallel, and hence that each granule must be a single crystal, but that between two neighboring crystals there was no uniformity of direction of the planes of crystallization. Bertin, on the contrary, in 1866 came

* "Physical Geography," p. 95. † "Le grain du glacier." Arch. des Sci. tome 7.

to the conclusion that there is a certain determinate arrangement of the axes of crystallization, and that the ice of the glacier in its crystalline structure is little by little brought to resemble lake ice. Ch. Grad and A. Dupré advanced the same views in 1869. J. Müller in 1872, and F. Klocke in 1881, differed from Bertin, and held that the planes of crystallization in glacier ice lay confusedly in all directions, which view Forel espoused in 1882. Later in the same year Hagenbach-Bischoff published his views, in which he steers a middle course. On the one hand he differs from Klocke in that he believes that there is "a certain predominant orientation which is in the direction of pressure:"* on the other he would have Bertin, Grad and Dupré "replace the term *parallélisme de tous les axes* by the more restrictive expression *direction prédominante*."†

Whatever may be true in regard to the planes of crystallization, it is certain that "the ice of the granule of the glacier is remarkably dense (*compacte*),"‡ while that which cements adjacent ones together must be loose in texture, principally from the bubbles of air located there. This is the reason why a blow of the hammer will cause "the ice" to crumble to pieces—break *between* the granules instead of *across* them. Now it is clear that whatever will bring about mobility among the granules will facilitate the motion of the glacier. And it is equally clear that the weakening of their cohesion, the great essential of mobility in all bodies, must come through a partial melting, which would of necessity

* "Le grain du glacier," *Archiv. des Sci.*, tome 8, p. 359.

† *Ibid.*, p. 360.

‡ *Ibid.*, tome 7, p. 332.

originate in the interstitial ice and remain there as long as it was partial. This melting of the interstitial ice, besides weakening the cohesion of the granules, must, by the very act, form about each a water-film which would of necessity facilitate the sliding of one past the other.

Now gravitation, as we have already seen, produces this partial melting by lowering the freezing point of water under pressure. Pressure in the glacier must originate in four ways: that which comes from the downward thrust of the ice masses higher up; that which comes from the elevation of the glacier's head above the level of its lower reaches; that which comes from its own superincumbent weight; and finally, that which comes from the irregularities and friction of its bed.

Heat, by causing the ice of the glacier to thaw and soften, also tends to produce mobility among its constituent particles by weakening their cohesion by a partial interstitial melting within the body of the glacier and by lubricating them with the water which has pervaded the mass from the melting surface above.

Having now given in detail the different ways in which heat and gravitation must act to produce motion in glaciers, let us see how this explanation of their combined action will harmonize with known glacial phenomena. As has been stated above the irregularities and friction of its bed must tend to produce pressure in a glacier and tension at right angles to this pressure, of which its veined structure and crevasses are an index. Thus a change of inclination of the bed of the channel, the widening or narrowing of its sides and the friction of both, produce respectively transverse, longitudinal and marginal crevasses and veins. Ice of the peculiar granu

lar structure to be found in glaciers, when under slowly applied but enormous pressure, aided by the heat of sun and air, will, like viscous bodies, move differentially, but on the slightest transition from the previously existing conditions of its channel, will, unlike these, experience fracture or compression as the case may be. The ice will pursue preëxisting lines of motion, first as far beyond the point where the change takes place as the cohesion of the mass will resist tension, or pressure, and then sooner than yield will break or become compressed. In other words granular ice, owing to the physical conditions under which it exists in the glacier, experiences an almost perfect mobility of its constituent particles, *within very narrow limits; but exceed these by a hair's-breadth*, and it will lose its continuity or change its aggregate form sooner than yield to the stress put upon it. Tar and other viscous bodies, under like conditions, would experience a mobility of particles within very wide limits; for in tar it is the ultimate molecules concerned in the motion—not the discrete granular particles as in ice. The former is a true viscous body, the latter has been fitly called a *viscoid* body.

In accounting for the erosion wrought by a glacier, it is only necessary to compare it with that of running water, remembering the difference between the free flow of water and the limited mobility and unyielding nature of glacier-ice. As the particles constituting the mass of the ice are mobile only within very narrow limits, we should expect it when in motion to wear down the inequalities of its rocky bed, whether hard or soft, to one common level. On the other hand, the molecules of water, having an almost perfect freedom of motion in

seeking lines of least resistance, would spend most of their erosive energy upon the softer rocks, leaving the harder ones in bold relief. In like manner we should expect ice, when effecting erosion by means of rocks and earth held in suspension, to act, as Agassiz has expressed it, "like a vast file set in paste," creating ruts and scratches in the surface of its bed, parallel to the line of its swiftest motion, since the graving tools can of necessity experience no greater freedom of movement either upward or sidewise than the ice that holds them as in the grip of a vise. On the contrary, the foreign matter held in the slight and uncertain grasp of running water, curvetting hither and thither with every freak of its water-carrier, erodes irregularly and erratically. Finally ice, from the strong cohesion of its mass, would be expected to pass over the small inequalities of its bed, like a moving bridge, only affecting those of larger area. Water would adapt itself to every irregularity of its bed, even the smallest. And so in every particular we find it in nature, as the polished billowy surfaces, parallel scorings and *roches moutonnées* of old glacial regions and the irregularly carved rocks of old river beds, will respectively attest.

That a glacier must move more slowly in winter than in summer becomes evident at once when we consider the part heat plays in its movement. Moreover, it is evident that the motion in summer must be exactly as much greater than that in winter, as the heat from all sources during the summer months exceeds that of the winter months, less the increase of motion that must of necessity result from the increased pressure of the winter's snow-fall.

That the friction of its bed should produce in viscid ice the same differential motion it does in viscous tar is clear from the above reasoning. We should naturally expect that the granules near the centre and surface of the glacier, free from the friction and contact of another surface, would gradually gain on those retarded by the sides and bottom of the bed. It is also natural that the velocity of the glacier should increase with the slope, as increased slope means increased pressure and decreased resistance to its downward progress.

That it should increase with the depth is also evident, since that means increased pressure from the additional weight of the superincumbent masses.

That glaciers should conform to the larger and more gentle irregularities of the bed, and not to the smallest and sharpest, is clear from the above enunciation of the properties of granular ice. The cohesion of the usually rigid ice, under the stress of pressure and heat, is weakened far enough to allow it *gradually* to adapt itself to the *larger* inequalities of its bed, but under *no circumstances* will it obtain mobility of particles sufficient to allow it, like fluid bodies, to *suddenly* accommodate itself to *smaller* inequalities.

All the conditions discussed above become, of course, magnified in polar glaciers, as here we have huge sheets of ice that, as a general rule, disregarding the natural conformations of the ground, sweep over hill and dale alike, and finally push out into the sea, to give birth there to bergs and floes. These images of still vaster ice formations, in the past ages of our globe, must exist under an enormous pressure both from névé and glacier ; for the snow-falls on these lands of the midnight sun are

very heavy and of frequent occurrence through the greater part of the year, and, in consequence, the resulting glaciers are of gigantic proportions. Some attain a thickness of several thousand feet, and, as in the case of the Humboldt glacier, a frontage of forty-five miles, while the Antarctic ice-cap constitutes the vast grave-stone of a continent forever dead to man. This enormous increase of pressure, as has already been stated, insures a higher rate of motion as compared with Alpine glaciers, amounting to as much as sixty feet per day.

In conclusion, I would sum up by saying that it seems to me the action of gravitation, especially that at play in the névé, must be the most important factor concerned in glacier motion, while the action of heat, though essential for the evolution of snow into ice, must ever be regarded as subsidiary to the former. Gravitation acts uniformly all the time and under all conditions—heat can have but little influence in the dead of winter or in high latitudes; yet it is just in these regions that glaciers experience the highest rate of motion.

Occidental College, Los Angeles, Cal.

PROBLEM OF
INTER-OCEANIC COMMUNICATION
BY WAY
OF THE AMERICAN ISTHMUS.

PROPOSED UNIQUE SOLUTION,
1866—1888.

BY
A. ANTHONY DE GOGORZA.

SYNOPSIS OF MR. ANTHONY DE GOGORZA'S PAMPHLET OFFERED TO
THE A. G. S., BUT NOT READY FOR PUBLICATION.

The object of this memorandum is :

1st. To vindicate in all its bearings the exactness and fairness of my survey—and to record where Nature itself has *located the "strait"* and marked the place for an inter-oceanic canal.

2d. To explain how my proposed route was reconnoitred—and next officially disregarded.

3rd. To expose the means resorted to, in 1876 and 1880, for attributing to me another and utterly impracticable route, and thereby misleading the learned societies and the public.

4th. And as a sequel thereto, the erroneous information deliberately laid in 1883 before the Senate, in answer to an official query.

In part I.—"*Magna est veritas et prævalebit*"—I attribute the failure of modern explorers : 1st., to their

having always looked for the narrowest crossing ; just as if a leader should choose the narrowest and deepest bed of a river for his troops to ford. 2d., to their having all neglected to consult in the archives of Spain the maps and reports of those who had conquered and held the country for more than three centuries.

I insist upon the fact, that I considered it my first duty to make a thorough search, and that I copied numerous charts and reports, the list of which I give, and from which I unearthed the "*secret of the strait*"—and was enabled to plan and conduct my survey with every requisite element to make it a success.

That next, in January, 1866, I entrusted the technical work to Mr. Louis Lacharme, whose fitness I had tested for many years in the wilds of South America and California ; who spoke the language of the country, knew how to make friends of the Indians, was broken to the climate and to the hardships of the forest, and was in every way, like his few picked companions, up to the task before him.

They were provided with a full set of suitable tools, from Bunten's mercury barometers, Charles's gradiënter, Throgmorton's surveyor's compass, large aneroid barometer, etc., down to sounding-lines, abundant new gold coin, and presents for the Indian Chiefs, such as never reach the hands of traders.

The survey was carried over up the *Tuyra* and *Paya* rivers to the divide, 190 feet above sea level, and down the *Cacarica* river toward the Atrato ; bearings and distances being mapped every 10 minutes, and the altitudes at each stop 1, 2 or 3 times a day.

The results were set down in a short practical report,

accompanied with a detailed map and *original field book*, and a duly acknowledged statement under oath.

I proceeded *first* to Washington, where I submitted the aforesaid papers to a group of influential members of Congress,* who, on the report of their Engineer (Mr. Edwin Johnson of Middletown, Conn.), that the "tracing for the purpose of a canal was *superior to any hitherto presented*"; and on the advice of the chief officers of the coast survey, resolved to meet the expenses of a resurvey: and therefore obtained from the *Navy Department* the help of U. S. vessels, &c., &c. But when we were already in Panama, and the gunboat *Saco* (Commander Wilson) had gone to bring my former surveyor to join the party, the Congressmen's agent, under the Panama R. R. Co's. influence, left suddenly for New York, and thus and then wrecked the operation.

I then went to Europe, published my report and map, and submitted them to the critical remarks of the most competent men I could find—receiving in every country the same hearty approval that I had, at the start, met with in Washington.

I was even able to incorporate in Paris an "*international company*," with shares of *five thousand dollars each*, to which many an American of rank and wealth subscribed. A preparatory meeting was presided over December 20, 1869, by Gen. N. P. Banks; but the proceedings were brought to a close by the announcement of the U. S. actual official survey January 10th, 1870.

President Grant himself showed his deep interest in

* Sen. Sprague, Gen. Benj. Butler, Oakes Ames, Capt. Patterson for Fred. Billings, J. A. Raynor, E. Hoyt, C. K. Garrison, W. E. Dodge, J. H. Griswold, M. Ketchum.

the matter, by requesting Gen. N. P. Banks to hand him my maps and documents for the use of the U.S. expedition.

At Bogotá, in a lecture before the President of the Republic, the Archbishop, the Foreign Envoys and many other prominent persons, I affirmed the existence of a former free communication between the oceans through the valley of the Tuyra; and my conclusion, that in this direction lay the "*to be or not to be*" of a canal, was unanimously accepted.

Again, the distinguished U.S. Envoy at Paris, the late Hon. Elijah Washburn, who knew that I was an American born citizen,* kindly backed with his commendation a letter of mine to President Gen. Grant, praying for his protection to a *private American concern* to hold the most liberal right of way for a canal across the Darien Isthmus, that I had just obtained from the Colombian Government.

By far the most significant and flattering approval was, however, that of the International Geographical Congress held in Antwerp, in which many of the more eminent geographers, professors and scientists of *all nations* took part, either in person or by letter.

Of the Americans personally present it suffices to name the Emperor of Brazil and Mr. Francis A. Stout, the latter representing the American Geographical Society; and the names of Prof. Agassiz and Com. Maury were also on the list.

After discussion of the question: "*Which is the more favorable place for the opening of the Inter-oceanic*"

*My father came to America in 1793, took out his letters of citizenship, Aug. 2, 1796, and married in New York. I myself, as one of the early successful miners in California, and an American, was appointed to represent the State at the Paris Exhibition.

Canal across the American Isthmus?" the British Adml. Ommaney, as President of the section of cosmography, navigation and commerce, brought the verdict in favor of Mr. Anthony de Gogorza's *project across the Darien*; upon which the following resolution was *unanimously* adopted: "*The congress recommends the work of the above-named savant to the consideration of the great maritime powers, and of all the learned societies*" (p. 362, 1st vol. of proceedings; and my map of survey, p. 323).

I have no pretensions to the title of "*savant*." But I have pledged my good name to the sincerity of my survey, and under no circumstances can I permit any one, and least of all an officer of my own country on duty, to put it in jeopardy without an energetic protest and rectification.

Further, in Harper's New Monthly Magazine for Nov., 1873, under the title of the "*Secret of the Strait*," a writer whom I do not know copies the summing up of my report, and is led to the positive conclusion (p. 812) that "both oceans mingled their waters as late as the pliocene period."

Finally, Dr. Maak, geologist of the United States Expedition, fully confirms (*p. 167 of the official report*) my theory "of a complete separation of *two distinct cordilleras, between which*, up to the later tertiary period, both oceans freely mingled their waters."

I add that a few thousand dollars and 4 or 5 days of easy work would cover a resurvey from the confluence of the Paya and the Tuyra, and across to the upper landing on the Cacarica, to prove that I have *pointed out the only right place*: and the revival of my grant would be a pure matter of form, since I never made it over

and it has never been withdrawn, either legally or administratively—neither so notified to me.

I now copy from a leading Journal: “The *Darien Canal can be cut* and must be cut! It is wanted by the American people as the unconstructed link of our coastwise transit, and the needed complement of our great ocean domestic trade; and is therefore a peculiarly American enterprise.”

If this be true—I conclude—what more? With intervening lagunes 30 feet deep, and the confluence of the Cacarica and the Atrato 12 feet above the Atlantic, just about the mean *overrise* of the Pacific’s tide! and the most magnificent harbors at both termini—what more is needed to mark and *record* forever the *place* where to reopen the old channel, and to solve the *great problem*, by making the *American Strait* the natural separation of the two Americas?

Part II.—“*Scripta manent*”—refers to Com. Selfridge’s reconnoissance of my route, published in New York, with map drawn for the occasion by Com. Lull; and to the all-important fact of a messenger sent over from Paya January 13th, 1871, by Com. Selfridge with dispatches for the Secretary of the Navy, and letters to the United States Consul at Panama, “announcing *his discovery* of a route for the Canal, with ground favorable on both sides of the divide”—which great news was then published all over the world.*

On January 18th, the commander returned on board the *Guard*; but before embarking on February 7th,

**N. Y. Herald*, March 1st, 1871, from its *local* correspondent—published *February 10th in Bogotd*—and in San Francisco, Cal., Philadelphia, Havre, Paris, London, etc., etc.—all over the world, in fact.

in the *Nipsic*, which, by the above cited letter, he had requested the United States Consul at Panama to order *at once* to the mouth of the Atrato—he sent Master Couden to run a line of levels along the Paranchita towards the Cué (that this might be made to appear, *when needed*, as Gogorza's route), and instructed Master Sullivan to make a regular survey of the Paya route, which he had himself reconnoitred.

Next, I criticize the *official report* given to the public *only four years later*; a report which, in flat contradiction of the precedent information, states on the same date and from the same place of Paya, January 13th, that “the ground being very broken, Com. Selfridge abandons *this* route to run up the *Cué* river,” and on the 18th, from on board his vessel, confirms his resolution of “adopting the Paranchita as the line of future operations *instead of the Cacarica* ;” thus and then plainly *disregarding* my route by Paya with its 190 feet divide, *for his own plan*, to meet Mr. Couden on the *Cué* at an altitude of 763½ feet.

As to the survey Master Sullivan was ordered to make of the already trodden path to Paya, it appears *officially* to be a hide-and-seek arrangement between both masters; ending with the amazing statement of their “*having been unable to reach the place*—undoubtedly the lowest in the cordillera, that Com. Selfridge crossed in his way to Paya ;” and the document closes with the assertion “that there remains no doubt of the inadaptability of the Darien for a Canal—except by the Napipi route (which is no part of Darien) !”

I conclude, for my part, that in spite of the inconsistency of this report, and the avowal that my route had not

been surveyed, I must do the Commander the justice to remark that he abstained at least from maliciously charging upon me the choice of the Paranchita and Cué route.

In Part III.—“*Is fecit cui prodest*”—I deal plainly with R. Adml. Ammen’s communication of 1876 to the American Geographical Society, printed in 1880, in Philadelphia, in a pamphlet under the title of the *Inter-oceanic canal question*, but of which I could not obtain a copy until the present year.

I show the R. Adml.’s hastiness of language in branding as *adventurers* many honorable members of the Second International Geographical Congress, of 1875, held in Paris, who felt that Com. Selfridge’s Darien survey amounted to *but little*; and the way in which he contradicts himself, when, after emphatically praising the work of the officers that he had appointed,—he denounces, in so many words, that very same “Com. Selfridge’s reports on the Napipi route as of pure invention, without himself or any of his party having ever been on the ground.”*

Next, I express myself indignant when the R. Adml. attributes to me the route by the Cué—a river not even mentioned in my memorandum nor in my maps of 1868 and 1870—and when he says, in words nothing less than offensive, that “the line run in examination of this supposed route established the fact that Lacharme and Gogorza were pretenders,” etc., etc.

How could a line planned by Selfridge, and surveyed by Couden, make a pretender of Gogorza? If called upon to explain such allegations, the R. Adml. could not

* Pages 55, 71 and 76.

bring forward a single honest argument in their support. Meanwhile, the credit given to his official position did hurt a legitimate undertaking; so that impartial minds may well inquire, "*What can have been his motive?*" and weigh *his responsibility* in the premises.

Again, in a virulent article inserted in the N. A. Review for February, 1880—R. Adml. Ammen says that "in April, 1866, a Mr. Gogorza sought his acquaintance."

To this I answer by the copy of a letter from a Capt. Daniel Ammen, dated Navy Yard, Washington, November 13th, 1865, seeking information which I willingly gave by return mail from Panama, December 12th, 1865.

He says further that on presentation of my pamphlet in the fall of 1876 *by the Secretary of State*, he pointed out by the height "given to the mouth of the river Paya, *that what was asserted as a fact was a mere fallacy.*"

Well, the height given by me to the mouth of the Paya, in 1866, was 145 feet (as acknowledged by Com. Selfridge, p. 35 of his official report)—and the United States Engineers gave 144 feet in 1871—one foot difference on a run of six days and above 60 miles!

To the other improper and rather personal remarks, I have to say that the fallacy lies not with me, but with the Rear Admiral, who is decidedly adrift in regard to the subjects of which he means to write.

Part IV. "*Seek and ye shall find,*" May 2d, 1883. In compliance with the Senate's resolution, the Secretary of the Navy communicates the *information collected by the Bureau of Navigation* (of which R. Adml. Ammen was then Superintendent) about the problem of inter-oceanic communication by way of the American Isthmus.

This information fills an extensive book containing 249 quarto pages and numerous maps.

It begins with the discovery of America and touches many subjects, though it omits some interesting facts pointing to the strait, and distorts some others; it criticises M. de Humboldt and sings the praises of Rear Admiral Ammen; invents an upheaval theory; has some botanical description which is erroneous; and indulges also in Darwinism.

But the compiler, who is quite profuse in his references to Tehuantepec, Nicaragua, Chiriqui, Panama, etc., says, p. 70, that "*a brief reference only will be made to the project of Gogorza.*" He then describes *exactly* the line followed by my surveyor "up the Tuyra and Paya rivers, across the divide 190 feet—and down the Cacarica towards the Atrato."

The sixteen following pages and maps are devoted to a description of lines drawn from 1520 down to our days: and when my line is fairly rubbed out of the reader's mind, the compiler describes likewise exactly the "*line planned by Com. Selfridge, from the Atlantic up the Atrato and Paranchita, and from the Pacific up the Tuyra and the Cué; the parties meeting at a point of the divide above 800 feet high. The object of the survey was to prove the utter impracticability of the route.*" And then he concludes: "*The result of this survey settled the project of Gogorza.*"

Is it necessary to point out once more, how disingenuous it is to describe as mine an utterly impracticable route confessedly planned by the Rear-Admiral's chief officer? Or need it be shown how disrespectful and how inconsistent it is to affirm *in an official report* to

the U. S. Senate, that a line *via* the Paranchita and the Cué settles my project for a line *via* the Cacarica and the Paya?

Without further comment, I contend that the *U. S. Inter-oceanic Commission*, of which the Rear-Admiral was a member, was misled, as the U. S. Senate also was misled in this matter; and that the decision arrived at by the Commission is therefore *disqualified and null*. Further, if Master Sullivan could not find the much-beaten track to Paya to which he had been ordered, how did the report from there, March 19th, reach London "of an elevation of divide not over 150 feet, and hopes to find a lower point in the dividing ridge"?

It is my hope that a man will be found in the United States Senate who, for the honor of the country, will call for an inquiry, by which many other strange things, indeed, may be revealed.

"Seek and ye shall find."

ANTHONY DE GOGORZA.

GEOGRAPHICAL NOTES.

THE PRONUNCIATION AND ORTHOGRAPHY OF GEOGRAPHICAL NAMES.—It is to be hoped that the International Geographical Congress of 1889 will do something for the proposition, at least, of a working system for writing the names of tribes and peoples and places in those parts of the world that are not European by language. Schemes there are in abundance, and any one of them, if it were generally adopted, would do away with a vast amount of confusion ; but the difficulty is to get a concert of action among geographers. This the Congress alone has the power to secure, and the coming occasion ought not to be lost.

No one of the obstacles that stand in the way of the adoption of a prime meridian, or the introduction of the decimal system of weights and measures, has to be encountered in this reform. National pride, mental habits, old associations and darling vanities are left untouched, for the outlandish names, strange under any form, have taken root neither in English nor in German, nor in French nor in Italian.

Prof. Alfred Kirchhoff treats this subject of pronunciation in the *Deutsche Rundschau für Geographie und Statistik* for October, with special reference to the practice of German travellers and writers, and the correction of the existing errors in the German transcription of foreign names.

With or without the support of the International Geographical Congress every traveller, of whatever language, can observe the simple recommendation with which Prof. Kirchhoff closes his paper :

“The more we ought to insist upon pronouncing names as nearly as possible in the way they are sounded on the spot, so much the more it becomes the duty of our explorers to give us the precise sound and accentuation of all names. How easy it is to write after Chihuahua (Che wah' wa), and how much it helps !”

ON THE OCCUPATION OF TERRITORY.—The Institute of International Law, which met at Lausanne in September last, made an effort to agree upon the rules and principles to be applied to the occupation of territories, either uninhabited or in the possession of people not yet civilized. Mr. Martitz, of the University of Tübingen, presented a report from the committee appointed in 1885 to consider the subject. The first article of this report declared : “Any and every region, which is not found to be under the sovereignty or protectorate of one of the States which form the community of the Law of Nations, is to be held and considered as a territory without an owner ; and this, whether the said region is inhabited, or not.”

If this principle is admitted, says the Madrid *Revista de Geografía Comercial*, it follows that all the savage or barbarous tribes of Africa are to be regarded as destitute of individual rights, and are, therefore, at the mercy of the first comer. This is neither more nor less than a law of force, invented for the use of civilised nations in order to enable them to wrest from inferior races the country that is rightfully their own. The Institute took the same view, and rejected the article.

M. Engelhardt, of the French diplomatic corps, proposed the adoption of the following resolution :

“ The Institute, considering that the greater part of the acquisitions of territory made within these later years in the African Continent have for a basis agreements made directly with the native chiefs, declares itself favorable to this proceeding, and holds that it ought to be the rule for future occupations.”

The Institute approved the sentiment of the resolution, but decided not to commit itself to the recognition of the rule.

THE CROSSING OF GREENLAND.—Dr. Nansen, a Norwegian explorer, on the 17th July last, reached Sermilik Fjord, on the E. coast of Greenland, 65° 30' N. Lat., intending to cross the country to Christianshaab on the W. coast.

The attempts of Dr. Hayes and Nordenskjöld and Lieut. Peary were all made from the W. side, and Lieut. Peary, the most successful, penetrated only 100 miles, though the Lapps of Nordenskjöld's party reached a point 135 miles from the coast.

A letter from Dr. Nansen to Mr. A. Garuel of Copenhagen, is published in *Nature*, of Nov. 22 :

GODTHAAB, OCTOBER 4.

.....
As you will know, we left the *Jason*, the Norwegian sealer, on July 17th, and expected to reach the shore the next day. But in this we were sadly disappointed. Screwing ice, maelstroms, impassable ice, where it was alike impossible to row or to drag the two boats, stopped us.

One of the boats was stove in, but we got it repaired again. We drifted seawards at a speed of thirty sea miles in the twenty-four hours. Drifted in the ice for twelve days. Strove hard to get to the shore, were three times on the point of succeeding, but were as often carried out to sea again by a current stronger than our power of rowing. Were once, for a whole day and night, very near perishing

in tremendous breakers of the sea against the ice-rim. After twelve days' drifting about, we managed at last to get ashore near Andretok, north of Cape Farewell, at 61° and some minutes of northern latitude. We rowed again northwards, reaching Uminik, from which point the crossing of the inland ice began on August 15th. We directed our course for Christianshaab on the western coast. Encountered severe snowstorms and had heavy ground. Estimating that it would be too late to reach Christianshaab in time for this autumn's vessel, we altered our course and steered for Godthaab, the ice-fields in that direction having besides been hitherto trodden by no one. After altering course, reached height of 10,000 feet, with temperature of 40° to 50° C. below zero. For several weeks we remained at an altitude of over 9,000 feet. Tremendous storms, loose, new-fallen snow, enormously difficult passage. Towards end of September we reached at last the western side above Godthaab. Had a perilous descent, on ugly and very uneven ice, but got safely down to Ameralik Fjord. Managed to build a kind of boat from floor of tent, bags, bamboo reeds, and willow branches. In that frail craft Sverdrup and I rowed away and arrived here on October 3.

The four men are left at Ameralik, living there on short rations fare, but will be sent for as soon as possible. There you have in short outline our Saga. We are all perfectly well, and everything has been in the best order. I hope that we may catch this steamer, and that instead of this letter you may see our sunburnt faces.

With many greetings, yours ever devotedly
FRITHIOF NANSEN.

This letter, with one from Mr. Sverdrup to his father, was sent from Ivigtut.

Mr. Sverdrup repeats Dr. Nansen's story, with one or two cheerful additions :

"I must hurry up," he says, "as we are going to dine with the parson, and, in fact, we have not had time for anything, as since arriving here we have gone from one social party to another. You may see from that how well we are off. I was the only one of our whole party who got over all the tremendous fatigues without the smallest ailment. I am and have been all the time as fresh and sound as a fish."

HUDSON'S BAY AND HUDSON'S STRAIT AS A NAVIGABLE CHANNEL.—A paper on this subject, read before the Royal Geographical Society in June last by Commodore A. H. Markham, R. N., is published in the Society's *Proceedings* for September.

Commodore Markham gives a brief description of the

Bay (which he calls, oddly enough, the "Mediterranean Sea of North America"), a sketch of its history, and the results of his own experience.

Hudson's Bay lies between 51° and 64° N. Lat., and 78° and 95° W. Long. It is about 900 miles long and 600 wide, with an area of about 500,000 square miles. It is remarkably free from rocks and shoals, and the water has an average depth of 70 fathoms. It is added on the authority of Dr. Bell, of the Canadian Geographical Survey, that storms are rare in the Bay, that icebergs are never seen, and that fogs are infrequent and of short duration. The climate of the shores is mild and genial during the summer months, but the winters are very severe.

Hudson's Strait is a deep channel, 500 miles in length, between Labrador and the islands of Arctic America. The average breadth is 100 miles, but the narrowest part of the channel is 45 miles wide. There are no shoals nor rocks, to speak of, and the soundings in the Strait vary from 150 to 300 fathoms.

The historical account and the record of his own experiences are long and interesting, and Commodore Markham ends them with these words: "Since the keel of Hudson's good ship, the *Discovery*, ploughed the waters of the Strait (in 1610), the passage has been made over 500 times, whilst the losses due to the ice might be summed up on the fingers of one hand." He maintains that Hudson's Strait is perfectly navigable and free from ice in August, and later in the season, and that powerful steamers could make the passage without difficulty.

The question is rightly said to be a purely geograph-

ical one, but Commodore Markham has so far forgotten himself as to write, without fear of the obvious retort, that "Monopolists and persons interested in other routes represent the difficulties offered by the ice in Hudson's Strait as fatal to the success of the project," (for a line of steamers to connect with a railroad between Winnipeg and Hudson's Bay).

In the discussion that followed the reading of the paper, Dr. John Rae said that Commodore Markham's experience was limited to a single voyage, and that as for Dr. Bell, there was no one on whom he (Dr. Rae) could place less reliance in questions relating to Hudson's Bay and Hudson's Strait.

What the obstructions are in the navigation of the Strait was shown by the following extracts from the ice records kept at the stations :

"September and October, 1884 (2 stations): ice heavy and close packed in Strait 27 days; ice heavy and a little water in Strait, 23 days; foggy, 5 days; strong gales and snow, 5 days.

"Four months, June, July, August and October, 1885, three stations: ice heavy and close packed, 98 days; ice heavy and a little water seen, 54 days; foggy, 6 days; dense fog, 1 day.

"Two months, June and July, 1886, at three stations: ice heavy and close, 43 days; ice heavy and some water, 42 days; foggy, 5 days; strong gales or hurricanes, 2 days; strong gale and thick snow, 1 day."

These extracts would be more convincing if the figures did not seem to defy the rules of arithmetic; but the phenomena described beautifully illustrate Commodore Markham's notion of the Mediterranean Sea.

CALIFORNIA.—In the *Deutsche Rundschau für Geographie und Statistik*, for November, Mr. Dionys Friedrich Rosenfeld, professor in the Hagi Christus-Lyceum at Constantinople, devotes eight pages to a sketch of California. The strictly geographical part of this sketch is fairly correct; but the statistical portion and the account of the people show that, if light comes out of the East, it does not always return to the place whence it came.

There are, according to Prof. Rosenfeld, 33 counties in California, and the capital of the State is Benicia, on Carquines Strait. The census of 1880 gives the State 53 counties, and the capital is, and has been for thirty-four years, the city of Sacramento.

The land is rightly enough described as a paradise, but it will astonish Californians to learn that the immediate neighborhood of San Francisco is the loveliest region in the State.

Prof. Rosenfeld holds very decided opinions concerning the people, many of whom, it seems, are the scum of Europe. He notes, at the same time, that the Germans are held in higher regard in California than elsewhere in the United States; a distinction which may, or may not, be due to the character of the scum. Besides the Germans, there are Irishmen, Englishmen, Chinese, Indians, a few Persians, and the Americans, "who fancy themselves the lords of the soil." There are Mexicans, also, whom Prof. Rosenfeld calls Spaniards, once wealthy, but now wrapped in their beggarly pride.

San Francisco makes a fine show, but has not a single building worthy of a great city. Everything there is matter of speculation, and the people are

given up to the grossest materialism. "No tower points to heaven in the city filled with all that is of the earth, earthy;" where the boasted American freedom is a privilege of color, and the august spirit of Christianity meets only with contempt.

The picture is gloomy, but Prof. Rosenfeld must try to possess his soul in patience. Possibly, he underestimates the Californians and overestimates himself.

M. CHAFFANJON.—If this enterprising French traveller does not deceive himself, he has done remarkable work.

He has reached, we are told, the sources of the Orinoco, never before visited, has found the mountain home of the Guaharibos, and has thoroughly studied the communication, hitherto very imperfectly known, between the Orinoco and the Casiquiare.

The results of so much labor will, no doubt, be given to the world in the form of a connected narrative; but it must be confessed that the traveller's letters, of which many have been published during the past year, do not convince the reader that he has narrowed the limits of the unknown. It is noticeable that the Spanish geographers, who are at home in South America, make light of his pretensions. The *Revista de Geografía Comercial*, of September 15th, says that M. Chaffanjon's discoveries were made 150 years ago by many persons, among whom are the Jesuit Father Román, Díaz de la Fuente, and Bobadilla; and also in 1756 by the Marquis del Socorro, Iturriaga, and the other commissioners charged with the settlement of the boundary line with Brazil. The Frenchman's haste to bestow a new name

upon the Sierra Parima, a range of mountains known for centuries, is humorously characterised as a kind of Anabaptist heresy.

It will be remembered that Count Stradelli, who has been travelling in the Orinoco country for a long time, met M. Chaffanjon at Ciudad Bolivar in April, 1887, and saw his maps, which did not bear out his claim that he had visited the source of the great river. This, however, he may have done; but the burden of proof is upon him, where so much is said to have been accomplished.

THE SOURCE OF THE MISSISSIPPI.—A telegram, dated Dec. 1, from St. Paul, Minnesota, announces the return to that place of Mr. J. V. Brower, formerly Register of the St. Cloud Land Office, who has been engaged for two months in the examination of the Itasca basin.

He is reported to have measured the inflow and outflow of all the streams, and his researches, it is said, establish the true source of the Mississippi in the centre of section 21 of the Government survey, in a small lake laid down on the maps of Jean N. Nicollet in 1836. It is added that the true source of the river has been in dispute, and that Willard Glazier's claim to have found it in 1881 is now proved to be false.

It is proper to say that Glazier's claim never was recognised for a moment by any one who had taken the pains to look into the matter. Mr. Russell Hinman of Cincinnati, in a letter to *Science*, of Aug. 13, 1886, thoroughly exposed Capt. Glazier and his methods, and Mr. Henry D. Harrower, of New York, did a similar good work in a pamphlet published two months later. Mr. Hinman detected Glazier's appropriation, word for

word and figure for figure, of a table of Meteorological Observations made by Schoolcraft in the year 1820 ; and Mr. Harrower printed this table.

The case was closed long ago ; and the only wonder is that Mr. Brower should have remembered that there had once been such a person as Capt. Willard Glazier.

GAURISANKAR-EVEREST.—The Indian traveller Emil Schlagintweit recounts, in *Petermanns Mittheilungen*, *Band* 34, *XI*, the history of the name by which the highest mountain of the earth is known in England and America. The height of the mountain was ascertained by the Great Trigonometrical Survey of India between November, 1849, and January, 1850. Sir Andrew Waugh, then at the head of the Survey, proposed, first to the Indian Government, and later (in 1856) to the Royal Geographical Society, to give to this mountain the name of his predecessor in office, Sir George Everest. This proposal called out Mr Brian Houghton Hodgson, long the English Resident at Khatmandu, who declared that there were already different native names for the mountain, and that he himself always used one of these, the name Devadhunga.

The matter was discussed at a meeting of the Royal Geographical Society on the 11th of May, 1857. Sir George Everest himself was present and expressed his thanks for the honor done to him by Col. Waugh, regarding it as a recognition of the importance attached to the work of the Survey ; but he thought there were peculiar difficulties in the way of adopting the name *Everest*, which the natives would find it impossible to pronounce. It could not be written, either in Persian or

in Hindi, and would be confounded with *O'Brien*, while the mountaineers might perhaps call it *Ob'ron*, but would surely miss the real word.*

Hermann Schlagintweit, who was in Nepal in 1857, wrote from Khatmandu on the 7th of March to King Friedrich Wilhelm IV. of Prussia, in these words : " This interesting line begins in the East with the heights about Kanchinjunga, to which succeeds the great *group of the Deodunga, lately named Everest*. * * * I had hoped until now that Mt. Everest bore the honored Old-Indian name of Deodunga ; but here the whole mountain-group is called Deodunga."

The first mention of the name Gaurisankar is in Map I of the Atlas to the 1st volume of the " Results of a Scientific Mission in India and High Asia " (by the brothers Schlagintweit), published in 1861 ; and the authority for it is found on page 193 of the 3d volume of the same work :

† " When in spring of 1857 my visit in Nepal enabled me to direct my telescope, in the presence of Jang Bahadur and several of his well-informed Pandits, to this mountain, which is such a prominent object in most of the views of the Sikkim and Nepal Himālayan crest, they most positively called it Gaurisankar or Chingopamari in Tibetan ; and when then asked about the other names they had mentioned to Mr. Hodgson, they repeatedly averred that they had not so clearly understood which was the particular mountain meant in the previous

* Sir George added : " As another instance of the difficulty which the natives experienced in pronouncing English names, he might, among others, mention that the name of the Hon. Mr. Cavendish was pronounced by them ' Humbel go mun-dee.' " *Proceedings Roy. Geog. Soc., Vol I., p. 351, 1855-57.*

† Quoted in English by Mr. Schlagintweit.

questions, alluding to the difficulty of finding the exact peak asked for without any other definition than the latitude and longitude."

The name does not appear in Hermann Schlagintweit's letter to the King, and the reason for its absence is given on page 142, vol. 6, of the *Results*: * "The highest mountains seen from Phallut are: 1, Kanchinjunga; 2, A very high isolated peak in Nepal. Campbell wrote me some names in a letter, when I mentioned it. Seems exceedingly high. I can hear no names."

The question was not raised again until 1886, when Col. H. C. B. Tanner and Gen. Walker, Director of the Indian Survey, declared themselves in favor of the name Everest, while Mr. Douglas W. Freshfield urged with the greatest ability the claims of Gaurisankar.

The only names of the peak reported by travellers are:

1. B. H. Hodgson, in the *Bengal Records*, No. 27, *Calcutta*, 1857, gives: *In Nepalese*: Devadhunga, Bhairav Langur, Bhairavthan; *In Tibetan*: Gnalham, Nyanam Thangla.

2. Dr. (now Sir) J. Hooker, in the *Himalayan Journal*: *In Tibetan*, Tsungau.

3. Hermann v. Schlagintweit-Sakünlünski; *In Nepalese*: Gaurisankar; *In Tibetan*: Chingopamari.

Mr. Emil Schlagintweit explains at some length the linguistic relations and the meanings of these names, of which Gaurisankar alone is exclusively Sanskrit.

Gauri is the name of Himavat's daughter, the wife of Siva, and is here equivalent to the *kind goddess*; while *Sankara*, the *beneficent*, is an appellation of Siva, and

* Quoted in English by Mr. Schlagintweit.

the whole word may be translated as "The mountain of Siva and his wife Gauri."

In English and American books and atlases the mountain, it has been said, is always *Everest*; in German and also in French publications the first place is given to *Gaurisankar*, and *Everest* is added below in smaller type. Mr. Schlagintweit proposes the double form Gaurisankar-Everest, in order to close the discussion and to save all acquired rights; but he may find that the climbing of the Himalayas was an easy task compared with the effort to make an end of controversy.

THE ERUPTION OF BANTAIKAN.—This mountain, which is situated about 100 miles to the N. of Tokio, Japan, suddenly woke from the repose of 1000 years into full activity, on the 15th July, 1888. There had been for two days before slight shocks of earthquake accompanied by rumbling sounds, but the explosion was wholly unexpected.

The mountain is about 6,000 ft. high and on its N.E. flank was a subordinate peak known as Little Bantaisan, which rose above three solfataras.

Nature, of September 13, quotes the account given by the correspondent of the London *Times*. According to this, Little Bantaisan was blown into the air almost in the twinkling of an eye, and a few minutes later its *débris* had buried or devastated an area about half the size of London. The correspondent was one of a party that visited the mountain. When they climbed to the ridge behind Little Bantaisan they saw to the right the incurved rear wall, a ragged cliff falling to a depth of 600 feet. Everything in front of this had been blown away

and spread over the country for thirty square miles. A very moderate calculation makes the mass of matter so distributed at least 700,000,000 tons. A vast sheet of ash-colored earth or mud obliterated every foot of the former landscape. The streams were dammed into lakes, and not a sign of life met the eye.

Besides the rain of scalding earth and mud, heated rocks and stones, sand and hot ashes, the eruption was accompanied by awful shocks, and by winds, or whirlwinds of extraordinary vehemence. Many of the rock-masses were of enormous size, and one, which was measured, weighed at least 200 tons.

One of the most appalling features of the eruption was the amazing speed with which the mud-stream flowed. When Little Bantaisan blew up, the people of Nagasaka, a village that remained comparatively uninjured, fled across the fields towards the opposite hills. A minute later came a thick darkness. The light returned in 10 or 15 minutes, but in that time the mud-torrent had travelled the ten miles to the village and buried almost all the fugitives.

Nearly 600 persons are said to have perished, but fuller accounts may add greatly to the number.

SCHWEINFURTH IN EGYPT.—In the *Verhandlungen* of the Berlin *Gesellschaft für Erdkunde*, Band XV., No. 8, Dr. G. Schweinfurth gives the results of his explorations in Egypt during the last fifteen years. The state of his health forced him to seek a southern climate, and he reproaches himself with having neglected Egypt in past years while he devoted so much attention to Central Africa ; as if a man, he says, were to give deep study

to the roots of a tree, and forget the trunk and the branches.

The almost universal impression that there is nothing new to be discovered in Egypt is in part inexact and in part wholly erroneous.

The name Egypt is too often restricted in its application to the narrow Nile valley, the Egypt of the classical world. We are largely indebted for our knowledge of this region to the French expedition under Bonaparte. It is when we look at the blank spaces on the maps of the Libyan and the Arabian Desert that we see what a mistake it is to regard our acquaintance with Egyptian geography as complete.

Dr. Schweinfurth begins his report with his journey in 1874 to the great oasis in the Libyan Desert, where his observations supplemented those made at the same time by Rohlfs.

In 1876 the first exploring expedition to the interior of the Arabian Desert was undertaken by Schweinfurth in conjunction with Dr. P. Güssfeldt. Starting from Benisuef on the Nile, they went eastward to Wady Arabah and the Red Sea, then south to the eastern slope of the Galala plateau, and thence westward to the Nile. Twenty-two points were astronomically established, and a number of elevations barometrically determined; and the geological results were important.

A second journey in the Arabian Desert was made the next year by Schweinfurth, who started from El-Tibin, above Cairo, and went to the east through the Wady-Warág. He explored the Galala table-land, and struck the Nile, on his return, at Keneh. The mineralogical specimens collected on this journey are now in the Museum at Berlin. The maps are still in MS.

Still a third journey in the same direction was made in 1878, the point of departure being near Atfeh, which is forty miles S. of Cairo, and the line of travel E.S.E. along the Wady Naumieh to its origin in the heights of the northern Galala, and thence to the Wady Arabah. The side-valleys of the Wady were visited where they cut into the plateau of the southern Galala.

The maps of this exploration are not yet made public, but they complete, it is said, the cartography of the eastern part of the Desert.

In 1879 a geological excursion was made in the northern part of the Desert between Cairo and Suez. This was repeated and extended the following year, and the summer of 1880 was spent in botanizing in the Lebanon.

In 1881 Schweinfurth was joined by Riebeck in a visit to the northern part of the Desert, and the two scientists, later in the year, made an exploration of the island of Socotra. The next year Schweinfurth made a long journey in Upper Egypt and mapped the western limits of the Nile valley. His map, as yet unpublished, is in the Berlin Bergakademie. In 1883 he made a voyage to the Marmarica (Cyrenaica), and in 1884 devoted himself to an accurate geological examination of the plain of the Pyramids and the western border of the Nile valley; passing afterwards through the Desert to the Fayoum. He was the first traveller to make the tour of the Birket-el-Kerun, since Martin's reconnoissance in 1801. In the north of the Birket-el-Kerun he found a hitherto unknown, well-preserved temple of the XIIIth Dynasty, and his survey showed that the outline of the reservoir on the existing maps was very defective.

The longest journey was made in 1884-85, a distance of 1500 miles through the Arabian Desert.

The route was carefully mapped, according to Schweinfurth's practice, but the map is still withheld.

The great traveller is incredulous with regard to Lake Moeris. He says: "The hypotheses which Mr. Whitehouse has set before the world with so much enthusiasm, as to the site and the circumference of the ancient Lake Moeris, are not confirmed by the observations I have so far made;" and farther on he adds: "Mr. Whitehouse seeks to establish a connection between the ancient Lake Moeris and the depression of the surface in the southern part of the reservoir; but this depression shows no trace of a fresh-water deposit, and it cannot be filled from the Nile."

Mr. Whitehouse has the English engineers on his side, and in such a conflict of authorities there seems to be but one way to settle the question, and that is to fill the basin from the Nile.

Arsinoe was explored in 1886, and a geological excursion was made to the Isthmus of Suez. In 1887, Dr. Schweinfurth made another journey in the Arabian Desert and geological explorations around the Pyramids; and in 1888 he joined Virchow and Schliemann in a visit to the Fayoum. According to the latest advices he is now in Arabia, devoting himself to the study of the coffee-tree.

THE STORAGE OF THE NILE FLOOD.—In an address before the London Chamber of Commerce on the 1st of November, reported in the *Chamber of Commerce Journal*, and illustrated by the map here reproduced,

Mr. Cope Whitehouse explained in detail his plan for storing the water of the Nile in the Raian Reservoir, a valley discovered by himself in the desert to the west of the river and about 70 miles south-southwest of Cairo.

The figures given in the address are convincing. At low Nile the supply of water passing the cataracts at Assouan is estimated at 50,000,000 cubic metres a day. The area of land only partially cultivated or wholly neglected in Egypt is more than 3,000,000 acres. To make this fertile, 4,000,000,000 cubic metres of water should be stored for use during the hundred days from February to June. The volume of the High Nile is ten times that of the Low Nile, and even in the worst seasons an enormous excess escapes into the sea. The Raian Reservoir when filled would make a lake larger than the Lake of Geneva, and 250 feet deep, and, allowing for evaporation, would furnish 5,000,000,000 cubic metres. Of the four possible channels between this Basin and the Nile Valley, Mr. Whitehouse has selected, after careful comparison of all the surveys, the one known as the Myana Pass. This is about 12 miles in length, and the cost of construction would be about \$1,000,000.

Adding to the actual outlay for the Reservoir a further sum for drainage and other subsidiary works, the total expenditure in fifteen years might be \$15,000,000. The land tax of Egypt is officially stated at £5,299,965, or about \$26,000,000. The revenue is £9,600,000, or \$48,000,000. The increased tax would amount at present rates to \$10,000,000, and the additional revenue to \$17,000,000. The area and productive wealth of Egypt would be augmented by more than one-third.

Mr. Whitehouse and those who are interested with



STORAGE OF THE NILE FLOOD.

him have made an offer to the Egyptian Government to find the money necessary for the undertaking, and also to keep the works in operation on very easy terms, giving the Government the right to purchase them ultimately at a low price.

The conception of this enterprise is entirely due to Mr. Cope Whitehouse, who has displayed remarkable energy and perseverance in vindicating and perfecting his plans in the face of discouragement and incredulity.

MR. WHYDAH.—Strange things are done in Africa—and elsewhere.

The *Revue Française*, of October 1, tells us that Admiral Hewett blockaded the coast of Dahomey, in the year 1875, in order to punish the king of that country for outrages upon "Mr. Whydah," an English merchant.

It is true that an Englishman was ill-treated in Dahomey and that a British man-of-war did exact reparation for the wrong in 1876, if not in 1875; but "Mr. Whydah" is evidently the well-known seaport on the Slave Coast.

The *Revue*, without the fear of La Fontaine before its eyes, has taken the Piræus for a man.

BRITISH EAST AFRICA.—Whatever may be the outcome of the British and German debate concerning Zanzibar, the African mainland in that neighborhood seems to be worth an effort. Mr. H. H. Johnston, who should know something of the matter, writes in the *Fortnightly Review*, for October, an article all aglow with admiration of the beauties and the resources of the territory ceded to the British East African Com-

pany, the "germ of a great empire of which it is the natural outlet."

The region covers 67,000 square miles, and stretches in a N. W. direction from the Indian Ocean to the Victoria Nyanza, its S. boundary rounding the base of Mt. Kilimanjaro, now a German mountain, and the N. limit lying beyond Mt. Kenia, which, being British, is or ought to be the loftiest peak in Africa.

The land is well watered and well wooded, a country of highlands and plateaux, with the climate and the flora of the temperate zone, though there is a tropical heat in the following description :

"The dazzling snow peaks suspended in the blue heavens, the black gulfs of the mile-wide craters, the countless cascades of the mountain torrents, the jagged outline of the distant violet-grey sierras, the shimmering azure of the hill-encircled lakes, the wide, breezy, grassy plains dotted with red ant-hills and slowly-moving herds of antelope and wildly-careering ostriches, the satin sheen of the banana plantations, the sparkling crystalline whiteness of the salt plains, the graceful clumps of bluish-green papyrus in the shallow pools and marshes that are the habitat of pink flamingos, white egrets, grey pelicans, and the Hagedash ibis, which is a walking rainbow ; the luxuriant greenery of the tropical forests, with their velvet-foliaged albizzias, their stately sterculias, sycamores, and parinariums, their india-rubber creepers, their emerald-green Ensetes (wild plantains), their wild date-palms, and their plume-like Raphias with the blood-red midribs to their fronds ; the natural parks, planted (by Nature) with clumps of shady acacias and "specimens" (one almost expects to see the name-ticket on them) of

elegant *Borassus* palms, and the orange-painted, branching, bushy *Hyphoene thebaica*, with its glaucous-colored, fan-shaped foliage."

The flight so well begun sinks into prose towards the end, and the writer is able to tell us calmly enough that the soil of British East Africa will produce nearly everything. Cattle abound, and the climate is favorable to all the domestic animals. The greatest heat registered near the E. of Kilimanjaro was 81° , and in the warmest part of the interior 91° . The average night temperature in the hilly districts is 60° ; in the plains 68° .

On the Victoria Nyanza there are a few rainy days in each month; but in the rest of the country, from June to the end of October there is almost no rain, and between November and May there is an abundant rain-fall during certain months.

The population is divided into the Masai and their helot races on the plains, and the Bantu peoples in the mountains. It is everywhere thin, except on the Victoria Nyanza, where there are between ten and twelve millions of people. The Bantu is everywhere a cultivator and a born trader. The Masai, formerly professed robbers and cattle-lifters, are learning to enjoy the sweets of traffic, and Mr. Johnston has great hopes of them. On the whole, if the country to the S. of Kilimanjaro is like that to the N. of it, Germany and England may conclude that the lines have fallen to them in pleasant places.

Mr. Johnston thinks the wild animals, and especially the lion, should be protected; though how the lion is to be preserved without sacrificing other beasts he does not explain. "The lion and the tiger," he says, "should be

regarded as privileged animals ;" and he thinks it a most pitiable thing that the Government of India persists in exterminating the tiger. As a disciple of Malthus, Mr. Johnston is perhaps convinced that the population of India is rapidly overtaking its means of subsistence, and he values the tiger, accordingly, as an active member of the Society for the Suppression of Hindoos. This view of the case would meet with general recognition, if Johnston were a Hindoo family name.

A CORNER OF DUTCH NEW GUINEA.—A paper in *Cosmos*, Vol. IX., No. VII., by F. S. A. De Clercq, Dutch Resident at Ternate, describes a visit made in 1887 to the islands of Kumamba, Mor, and Wiak, on the eastern side of Geelvink Bay. With this paper begins a series of articles on Papuasias, in continuation of those published several years ago in Vols. I.—IV. of *Cosmos*.

It is not easy to identify places in New Guinea, for the maps give one name, the traders another, and the natives a third—and the true one—to the same point, or island. The three islands above mentioned are grouped on the maps as the Arimoa, while they are known to the natives in the order given as Liki, Lansutu, and Armofin.

Mr. De Clercq stopped first at Liki, where canoes, each carrying one or two men, put off to meet the steamer. Each canoe was made of the trunk of a tree hollowed out, and the sides were raised by boards fastened on at such an angle as to interfere with the freedom of the rower when seated. This method of construction is found on other parts of the coast, and had its origin in the practice of standing up to manage the long oars ;

though in the present case the rowers sat with one leg over the other.

The natives, when they boarded the steamer, were friendly and entirely at their ease. They were robust and healthy looking, with dark skins and very thick hair, and some had full beards; their hair hung down in tresses, and some wore a kind of wig or skull-cap.* Very many wore, hanging from the nose, two hog's teeth, and a band of dogs' teeth passed around the chest and under the arms to the back, a collar of round bits of shell, and on the legs and arms tight, woven bands; these, and a patch of shredded bark secured around the middle, made up the whole costume. Their arms were long arrows and carved bows.

The women were withered and ugly. They wore their hair in tresses and had thin pieces of shell thrust through the nose. For clothing they had two aprons of bark, one hanging in front and one behind, and fastened with a rattan cord, and they wore a profusion of trinkets made of the pith of the scarlet *saga* bean and ornaments of tortoise shell. A string passed around the forehead and behind the ears sustained a bag in which were carried tobacco and pinang (betel); and in the bracelets of the forearm were stuck little spoons made of pigs' teeth and used for scooping out the cocoanuts.

The island was covered with a dense vegetation, which hid from sight the few settlements. One of these, called Béarikwar, was examined by Mr. De Clercq. There were two rows of houses, about 40 in all, built at

* These wigs, called *dubirau*, were made of human skin, taken ordinarily from the heads of those who had died a natural death. To keep them in their place, they are tied with a ribbon around the forehead.

regular distances in a direction from southwest to northeast, with a broad street in the middle and a temple at the eastern end. The houses rested on posts about 3 feet high and were surrounded by fences made of the ribs of the sago-palm leaves, carefully bound together. There were two openings, one in front and one in the rear, and each closed with a kind of portcullis, made also of the sago-palm. A tree-trunk, with steps cut in it, led to the opening. The roofs were of palm-leaves and descended to within about 18 inches of the ground. The enclosures were planted with the laurel-like *codium*.

The temple, which is called *tosi*, had no visible opening, all the cracks even being closed with dried leaves. The people vie with one another in making offerings to the spirits of the departed; but the custom is for the youths to assemble in a small building at a little distance. When the western trades blow, bonfires are kept up around the *tosi* day and night. The men meet and pass their time in singing to the sound of the flutes and the *tifa*. Dishes of various kinds are kept ready prepared in the houses and are brought by the young men, and sometimes fires are made of the fruits of the forest. The purpose of these ceremonies is to ward off misfortunes by doing homage to the spirits. It is in the temple that the heads of enemies slain in battle are deposited. Access to the temple is forbidden to the women, and no one is allowed to speak or to make a noise near it; but the uproar and the shouting within have no limit.

Usage requires a man to carry off his wife by force. In the struggle the man is slightly wounded with an

arrow, and then the girl is given up, so that she may cure him. The dowry consists of strings of dogs' teeth and other ornaments.

The natives count as far as five: *tès, lu, taur, fau, lim*. They have a word for ten, *sinafun*, and they count also on their fingers, but they never go beyond five. They seemed to be on good terms with their neighbors.

In the island of Mor, Mr. De Clercq found the people not so dark as those of Kumamba, whom in general they resembled. Their houses were unlike the other Papuan dwellings, so far as concerned the interior arrangement. There was but one room, and in this, at the height of about 3 feet from the floor, were oblong niches around the wall, at a short distance apart, closed on four sides and provided with a little quadrangular opening on the inside. These were sleeping-places; and alongside of them were baskets, filled with domestic utensils, provisions, and fire wood; and in one corner a layer of sand and a few cylindrical stones formed the kitchen.

From the roof were suspended the dishes and arrows and fishing apparatus.

The natives employ themselves in fishing, and in agriculture, this being the work of the women.

When any one dies his relations carve an image, and to this a special value is attached. Mr. De Clercq was unable to procure one, the belief being that he who parts with such an image will speedily perish by a violent death.

The people of Mor carry their numeration beyond that of their neighbors. From one to five the names are: *tata, rurò, òrò, aò, rimò*. Six is *rimò tata*, seven *rimò*

rurò, and so on to ten, which is *taurà*. Eleven, *taurà tata*, begins a new series of repetitions, up to twenty, which is *nautata*. Beyond twenty Mr. De Clercq does not go.

In a note to this paper Mr. Guido Cora, the editor of *Cosmos*, very properly calls attention to the fact that Mr. De Clercq's more extended observations corroborate the report made by the distinguished Italian traveller Beccari, who saw these islands in December, 1875, from the deck of the Dutch transport "Soerabaja."

The commander of this vessel, it is said, allowed Beccari just *five minutes* to get what information he could from the islanders who boarded the steamer, which was so far from being short of fuel that when she had reached Dorei (at the N.W. extremity of Geelvink Bay), there were still 200 tons of coal aboard.

"Probably," says Mr. Cora, "it was not desirable to give the Italian explorer an opportunity to visit places not yet well known to the Dutch."

This may be true, but then again it may not ; and there does not seem to be any great difference in spirit between the Dutch commander's supposed jealousy of the Italian and Mr. Cora's readiness to think evil of the Dutchman.

DOMINGO F. SARMIENTO.—This distinguished man, ex-President of the Argentine Republic, died on the 11th of September at Asuncion, Paraguay, in the 78th year of his age. He had spent, says the *Boletín del Instituto Geográfico Argentino*, sixty-two years in the service of his country, taking an active part in all public concerns, coming into collision with prejudices, and fac-

ing in the ceaseless struggle the fury of passion, but preserving from the beginning to the end a reputation without spot or blemish.

His zeal in the cause of education and his liberal ideas had brought him into relations with many of the most enlightened men in the United States and in Europe. He was an Honorary Member of the Argentine Geographical Institute, and freely used his influence and his means to promote the exploration and development of the vast national territory.

CESARE CORRENTI.—This eminent Italian, equally remarkable as a patriot, a statesman, and a scientist, died at Meina, on Lago Maggiore, on the 4th of October last, at the age of 73 years.

The *Bollettino* of the Italian Geographical Society, for October–November, says of him:

“From the foundation of this Society he was among its most earnest supporters and associates; he was its President from the year 1873 to 1879; it was he who organized and sent out the Italian expedition to Equatorial Africa, under the conduct of the Marquis O. Antinori; and he was unwearied in promoting the interests of the Society, and the progress of geographical exploration and of geographical studies in Italy.”

PRJEVALSKY. — This Russian geographer, one of the greatest among the explorers of Asia, died recently (the date not given) at Vyernyi, in the Eastern Thian-Shan Mountains. He was making ready for a fifth attempt to reach Lhasa, the Holy City of Tibet, from which he had been so often obliged to turn back.

More than any other man, Prjevalsky established the geography of Central Asia on a firm foundation. He possessed all the qualifications of a scientific traveller, and his death, at the early age of fifty, is an irreparable loss.

WILLIAM GIFFORD PALGRAVE.—Mr. Palgrave, whose work on “Central and Eastern Arabia” has been a classic for twenty years, died on the 30th September at Monte Video, where he had been for some years the British Minister-Resident and Consul-General. In Uruguay his special qualifications as an unsurpassed Arabic scholar and Orientalist were certainly wasted, and the sharp criticisms made upon the Government for relegating him to such an exile may be said to have been deserved; but Governments must often do what they can and not what they would.

Mr. Palgrave was a Jesuit priest when he went to Arabia on a mission from the Emperor Napoleon III. Soon after his return he left the order, entered the service of his own Government, and held successively various consular posts.

Besides the “Arabia,” he wrote “Essays on Eastern Questions” and “Dutch Guiana,” both works of permanent value.

LA GEOGRAPHIE.—A fortnightly journal, under this name, made its appearance at Paris, on the 15th October.

It is intended to aid in the diffusion of geographical knowledge in France. The number of November 25 contains a letter from Charles Soller, the African traveller, and an original map, on a scale of 1 : 8,000,000, from his notes of the caravan routes in the Western Sahara.

Ancient Rome in the Light of Recent Discoveries.—
By Rodolfo Lanciani, LL.D. (Harv.) With One Hundred Illustrations. Houghton, Mifflin & Co., Boston and New York, 1888.

This beautiful book is nothing less than a revelation, even for those who have had from time to time a hint of the work that was going on in Rome; for here they find disposed in order, and explained, the discoveries that have reconstituted within fifteen years the whole subject of Roman archæology.

Mr. Lanciani is the Director of Excavations for the National Government and the Municipality of Rome. One year ago he visited America, and gave, in a course of lectures, an outline of the changes in Rome.

A few lines of statistics from his preface are impressive. In the 14 years between January 1, 1872, and December 31, 1885, 82 miles of new streets were opened, paved, drained and built; new quarters have sprung up which cover an area of 1,158 acres; 3,094 houses have been built, or enlarged, with an addition of 95,260 rooms. The objects brought to light by these operations are innumerable, and Mr. Lanciani does not pretend to have counted them; but the Capitol alone has been enriched since 1872 with the following articles: 705 amphoræ, 2,360 terra-cotta lamps, 1,824 inscriptions on marble or stone, 77 columns of rare marble, 313 pieces of columns, 157 marble capitals, 118 bases, 590 works of art in terra cotta, 405 bronzes, 711 gems, intaglios and cameos, 18 marble sarcophagi, 152 bas-reliefs, 192 marble statues, 21 marble figures of animals, 266 busts and heads, 54 pictures in polychrome mosaic, 47 objects of gold, 39 of silver, 36,679 coins of gold, silver and bronze, and an

almost incredible amount of smaller relics of every material.

There have been discovered the stratum of prehistoric or traditional antiquities ; a necropolis older than the walls of Servius Tullius and containing more than 5,000 archaic specimens ; more than 5,000 feet of the great *agger* of Servius, and the site of fourteen gates ; and the remains of numberless houses and palaces, temples and shrines, roads and drains, porticoes, etc., covering an area of 3,967,200 square metres of the ancient city.

Mr. Lanciani deals very plainly with the false sentiment that has so loudly bewailed the ruin wrought in the picturesque old Rome by these works of excavation and improvement. To satisfy such a sentiment, he says, it would have been desirable to have had Rome annihilated at the end of the fifth century, so that it might be excavated as a buried city. It might be added that the living inhabitants of a famous place have a right to live and to move, to build and to rebuild their home ; and, further, that the people of London and Paris and New York, who fancy that Rome is dearer to them than to the Romans, would do well to inquire how many of the historic parts of their own cities have been sacredly preserved.

The book is brought out in a style every way worthy of its fascinating contents.

Western China : A Journey to the Great Buddhist Centre of Mont Omei.—By Rev. Virgil C. Hart, B. D. Fellow of the Royal Asiatic Society. Illustrated.

Boston : Ticknor & Co., 1888.

Mr. Hart, with three companions, the Rev. Ernest

Faber, Arthur Morley, M. D., and the Rev. H. O. Cady, left Hankow early in April, 1887, for the West of China, their object being the re-establishment of the American Methodist Episcopal Mission at Chung-King, the scene of the destructive riot in July, 1886.

A long residence in China, and a thorough acquaintance with the language and the people, enabled Mr. Hart to profit by what he saw and heard, and he has produced one of the most instructive of recent works on the great Empire.

As far as Ichang the voyage was made in a steamer ; beyond that point in native boats. The country was everywhere well cultivated—in some places remarkably so—and the scenery in the frequent gorges and along the rapids was strikingly grand. Sz-Chuan is one of the richest provinces of China, and seems to produce in abundance nearly every kind of crop, from potatoes to cotton. Near Kwei-cheu, a town which contains 2 mosques and 500 Mohammedan families, besides a Roman Catholic Church and 100 families of that faith, Mr. Hart first noticed the poppy plantations.

These became more numerous farther on, and of one place, beyond the Hu rapid, when the travellers had gone ashore to visit a little town that charmed them with its situation in the midst of well-cultivated hills and fields and its aspect of prosperity and cleanliness, Mr. Hart writes :

“The sallow complexion of the people, their emaciated forms and languid movements, attract our attention. . . . I do not see a beautiful face or figure, nor a rosy cheek ; a dead leaden color is on all faces, old and young, male and female. . . . Upon the mountain sides

are houses and hundreds of workmen; approach those busy laborers and you will see this death-like pallor on all faces. The climate seems the acme of perfection . . . yet there is a want of energy and life among the people."

The explanation of this shadow of death over a busy community of laborers is found by Mr. Hart in a poppy-field; and he apostrophizes the "seductive viper, curse of millions," without perceiving that his description proves too much. If the opium-eating laborers are listless and devoid of energy, who keeps up the cultivation of the smiling region, with its superabundant products

It was at the end of June that Mr. Hart and Dr. Morley left Chung-King to make their way in sedan chairs and by water to Mount Omei. On the way they distributed or sold a number of the Scriptures and tracts, but Mr. Hart's satisfaction in this good work was not unmixed, for on his return he found the people of one place gathered around a bonfire and feeding it with the books he had left among them.

The travellers went out of their road to visit the great salt-wells at Tsz-liu-tsin, about 175 miles S. W. of Chung-King. The frames, from 60 to 160 feet in height, above these innumerable wells, are visible at a distance of ten miles from the city. The wells, 6 inches in diameter, are bored through the solid rock to depths of from 2000 to 5000 feet; and they have been in operation for 1700 years. A particular well sometimes gives out and remains dry for an indefinite time, and then begins to flow again. The brine is carried to the boiling-vats through bamboo pipes. Mr. Hart saw the operation of hoisting the full tube at one well. Three water-

buffaloes turned a horizontal wheel, 22 feet in diameter, and brought up in a few minutes from a depth of 3300 feet about 300 lbs. of the brine. The manager of this well, when asked how long he had been in the business, laughed and replied : " Ever since the first Emperor of the Min dynasty ; for twenty generations, sir." Mr. Hart regards the establishment and maintenance of these wells as the greatest of Chinese achievements, not excepting the Great Wall.

Mount Omei lies about two days' journey beyond Kia-ting-foo, on the upper Yang-tse-kiang, and is described as " a centre of natural and artificial wonders, the like of which may not be found elsewhere upon the globe ; " a description which a good many other persons might be found ready to apply to a good many other places. There are mountains chiselled into the forms of idols, colossal bronze statues, pagodas, and one temple of rich bronze, and, above all, the Great Omei mountain, rising more than 11,000 feet in height. All these wonders are found within a radius of 40 miles from Kia-ting-foo. A mile or two below the city, on the face of a cliff that goes down sheer to the water, is the famous sitting Mi-léh Buddha, a figure carved out of the solid rock, and over three hundred feet high. There are small trees growing from the head of this statue.

The bronze temple, already mentioned, no longer exists. It was destroyed by fire in 1851 and now lies in a heap of twisted and broken metal. It was sixteen feet square and thirty feet in height, in three stories.

Mr. Hart devotes nearly 100 pages to the description of this far-away wonderland, and closes with some suggestions for more effective missionary work in China.

The Capitals of Spanish America.—By William Eleroy Curtis. Illustrated.

New York: Harper & Brothers, 1888.

Mr. Curtis was a member of the South American Commission, appointed by President Arthur to visit the countries of Central and South America for the purpose of establishing closer commercial and political relations between them and the United States.

Out of this mission came the present work. There was a book to be made, and Mr. Curtis has made it by gathering facts and the semblance of facts out of other books and working them into a kind of shape with observations of his own, some happy and just, but much the greater part wholly beside the mark. He had no preparation for the task he undertook. The evidences of his misinformation concerning Spain and Spanish America, the Spanish language, and, in a word, all things Spanish and Portuguese, abound throughout his pages. Some of the blunders are undoubtedly due to the proof-reader, but it is Mr. Curtis himself who calls the Chilenos *Chillanos*, and makes the Spaniards shout in Norman French, *Oyez, oyez*, at the telephone, and translates *Maria Carmen*, "Mary of Blood." The Portuguese name, *Rio de Janeiro*, being unfamiliar to mankind, Mr. Curtis writes out for it a pronunciation, the only use of which will be, in the words of the famous New Guide, "to make any one speak very bad the fore-mentioned idiom;" and strong in innocence as in triple mail, he does not shrink from complimenting educated Mexicans on their knowledge of their own tongue.

His references to ancient history, sacred and profane, are not less original than his Spanish and Portuguese.

Guatemala, he says (p. 68), was buried, "like Sodom and Pompeii," by a mass of ashes and sand ; and we are told on p. 701 that Demosthenes could make an audience weep or laugh at will by "simply uttering ' Mesopotamia.'"

The volume is rich in illustrations, many of them old acquaintances, and, naturally, somewhat the worse for wear.

Leaves from an Egyptian Note-Book.—By Isaac Taylor, M.A., Litt. D., Hon. LL.D., Canon of York.

London: Kegan, Paul, Trench & Co.. 1888.

Canon Taylor's book consists of notes of conversations with Egyptians on politics and religion. "I went to Egypt," he says, "the head-quarters of Islam, in order to investigate the truth of certain assertions which have of late been freely made as to the barbarism, ignorance, profligacy and intolerance of Mahomedan nations. . . . I have held long and interesting discussions, not only with Europeans resident in Egypt, and with men who fill important posts in the Egyptian government, but with Moslems of every class, who have conversed, without reserve, on the tenets of Islam, and on the condition and prospects of their country and their religion."

Mr. Taylor found, among the Pashas of Cairo and in the schools a degree of culture for which he was not prepared. In one day he visited two Pashas, who were well up in mathematics, and generally so highly cultivated that he asks how many morning calls one would have to pay in London before coming across hosts so intelligent and so accomplished. The answer depends upon circumstances. If Canon Taylor called upon the

right persons and found them at home, he would come across more than two Pashas in London who could discuss Darwin and mathematics with him.

There was no sign in Cairo of the intolerance imputed to Mahommedans. The people are sincere believers, but Mr. Taylor thinks there is less religious fanaticism in Egypt than in England. He found the learned Moslems familiar with the Bible as well as with the Koran, and he quotes the liberal expressions of one scholar with whom he talked : " We," said the Moslem, " welcome the fullest discussion ; it can only serve to bring out the truth Our religion, like yours, has been corrupted If we return to the pure teaching of Mahommed, and you return to the pure teaching of Jesus Christ and his Apostles, we shall find few points of difference to divide us."

The Pashas were ready to speak, not only of religion, but of polygamy and morals ; and they astonished Mr. Taylor by telling him that 95 per cent. of their class in Cairo had only one wife. All the Mahommedans with whom Mr. Taylor conversed were, without exception, in favor of the legal prohibition of polygamy ; and one, a lawyer, said that if the Khedive were to issue an ordinance to that effect, it would be accepted without serious objection.

As for the personal morality of the Pashas, and their freedom from vice, Mr. Taylor had the direct testimony of the gentlemen themselves. They assured him that they were respectable persons, and that their lives were beyond reproach.

Three of the time-honored Egyptian institutions, the *kourbash*, or whip, the *corvée*, or forced labor, and slav-

ery, find favor in Canon Taylor's eyes. Pasha and peasant alike think the abolition of the *kourbash* was an English mistake ; the Pashas, because it has made government more difficult, and the peasants, because they prefer the stick to the prison. The *corvée*, which also has been suppressed, had made it possible to execute the great public works in Egypt, and the objections to it are, Mr. Taylor thinks, sentimental rather than practical. His conclusion with regard to slavery has a strangely familiar sound of the olden time : " The slaves whom I have seen were sleek and well clad, and did not appear to be discontented with their lot."

The main argument of the book, if it be not meant for an imitation of the *Lettres Persanes*, is that Egypt ought to be governed by the English after the immemorial Egyptian methods. The labored comparisons and contrasts of Christian with Mahommedan religious faith and morality, personal and social, have no serious meaning. The subjects are at once too complicated and too intangible to be dealt with ; and common sense refuses to believe that the average human nature, even of Mahommedans, moves on any such lofty plane as that described by the Canon of York.

It may be a question whether the English ought to be in Egypt ; but there they are, and it is their duty to see that the country is governed with all possible regard to their responsibilities as a civilized nation.

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CHARLES H. BALDWIN.

Rear Admiral, U. S. Navy.

BORN, SEPTEMBER 3, 1822, IN NEW YORK CITY.

DIED, NOVEMBER 17, 1888, IN NEW YORK CITY.

Admiral Baldwin entered the Navy, as a midshipman, April 24, 1839 ; in the war with Mexico was several times engaged with the enemy about Mazatlan ; and, February 28, 1854, resigned his commission, being then a lieutenant.

For seven years he pursued a successful career in the mercantile marine ; upon the outbreak of the rebellion promptly tendered his services in defense of the Union ; commanded a steamer in Farragut's passage of the river forts and capture of New Orleans ; and actively participated in the first attack on Vicksburg, Miss. During the continuance of the civil war his duties were varied and arduous ; and, when peace was restored, his responsibilities increased with his increasing rank. He was promoted to be a Rear-Admiral, January 31, 1883, when he was assigned to the command of the European Squadron, in which elevated position he did the honors of our country with generous hospitality and courtly dignity.

Admiral Baldwin, after his retirement, September 3, 1882, began to decline in health, and this made it necessary for him to spend his winters in the genial climate of the Mediterranean Riviera. Upon his last homeward voyage he had a fall, from which he was too feeble to rally. Death terminated his sufferings November 17, 1888, at the early age of sixty-six.

During the last twelve years of his life, Admiral Baldwin was a Fellow of the American Geographical Society, and for seven of them a member of its Council. His associates recall with affection the charm of his manner, his quick intelligence and liberal culture, his force of character and nobility of nature, and sincerely mourn the loss of this brave and sterling officer, who faithfully served his generation, and bore an emphatic witness to the worth of manhood.
